NOTICE

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FINAL
Technical Memorandum

Monitoring of the 903 Pad/Ryan's Pit Plume

RF/RMRS-98-294.UN

May, 1999
Revision: 0

RF/RMRS-98-294 UN

FINAL
TECHNICAL MEMORANDUM

MONITORING OF THE
903 PAD/RYAN'S PIT PLUME

MAY 11, 1999

2

FINAL TECHNICAL MEMORANDUM MONITORING OF THE 903 PAD/RYAN'S PIT PLUME

TABLE OF CONTENTS

3

FIGURES

TABLES

ACRONYMS

µg/l	micrograms per liter
AHA	Activity Hazard Analysis
CERCLA	Comprehensive Environmental Resource, Compensation, and Liability Act
CDPHE	Colorado Department of Public Health and the Environment
CFR	Code of Federal Regulations
DNAPL	dense nonaqueous phase liquid
DOE	Department of Energy
EPA	Environmental Protection Agency
ER	Environmental Restoration
FO	Field Operations
HASP	Health and Safety Plan
HRR	Historical Release Report
IMP	Integrated Monitoring Plan
IHSS	Individual Hazardous Substance Site
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PARCC	precision, accuracy, reproducibility, completeness, and comparability
PPE	personal protective equipment
RAAMP	Radioactive Ambient Air Monitoring Program
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RMRS	Rocky Mountain Remediation Services, L L C
SAP	Sampling and Analysis Plan
SID	South Interceptor Ditch
UHSU	upper hydrostratigraphic unit
VOC	volatile organic compound

1.0 INTRODUCTION

The 903 Pad/Ryan's Pit Plume originated from releases that occurred at the 903 Storage Area (Individual Hazardous Substance Site [IHSS] 112) and Ryan's Pit (IHSS 109), previously designated as a part of the former Operable Unit (OU) 2 The 903 Pad/Ryan's Pit groundwater plume was sixteenth in the priority ranking in the September 1998 Environmental Restoration (ER) Ranking The source areas, Ryan's Pit and 903 Pad, were ranked first and sixth, respectively, in the ER Ranking The Ryan's Pit source removal began in September 1995 with the removal of contaminated soils The contaminated soil was treated in February 1996, and the project was completed in August 1996 with replacement of soils (RMRS, 1997a) The 903 Pad source removal is scheduled for 2001 The primary contaminants in the 903 Pad/Ryan's Pit plume are carbon tetrachloride, trichloroethene, and tetrachloroethene The Rocky Flats Environmental Technology Site (RFETS) agreed on a 1999 milestone for characterizing the plume groundwater wells to protect surface water quality in Woman Creek

In 1998, the RFETS program to characterize the 903 Pad/Ryan's Pit plume was approved by the Environmental Protection Agency (EPA) and Colorado Department of Public Health and the Environment (CDPHE) The characterization data showed that the contaminated groundwater plume was not affecting surface water quality, and there was evidence of the occurrence of natural attenuation As a result there was not a need for collection and treatment of contaminated groundwater in the distal end of the plume EPA and CDPHE concurred with this conclusion, and it was agreed that additional groundwater monitoring was required prior to making a final decision This technical memorandum provides the basis and technical approach for monitoring the 903 Pad/Ryan's Pit volatile organic compound (VOC) plume to provide data on natural attenuation and to protect surface water quality

1 1 OBJECTIVE

The objective of 903 Pad/Ryan's Pit VOC plume monitoring is to evaluate the potential for impacts on surface water quality

Corollary Objective Evaluate natural attenuation of the 903 Pad/Ryan's Pit Plume

The nearest receiving streams for the 903 Pad/Ryan's Pit plume are the South Interceptor Ditch (SID), located 150 feet upslope of Woman Creek, and Woman Creek (Figure 1-1) Examination of historical aerial photographs and enhanced multispectral scanner images (EG&G, 1989), and subsequent field observations made in December 1998 indicate several potential discharge areas for shallow groundwater associated with the 903 Pad/Ryan's Pit plume shown on Figure 1-2 No VOC or flow data are available for any of the seeps, however, recent field observations of seep characteristics indicate that surface flow, if present, would be intermittant and probably minimal Comparison of ditch bed elevations from as-built drawings of the SID to the projected bedrock surface elevations presented in Figure 1-3 indicate that colluvial groundwater, if present, should be close to bed level near the base of these structures The localized nature of this vegetation suggests that any emergent groundwater will primarily evapotranspire rather than discharge laterally as ditch flow

Contaminants from the 903 Pad/Ryan's Pit plume have not been detected in the nearest downstream surface water location Additionally, the concentration and total mass of contaminants decrease considerably downgradient from the source area VOCs have not been detected in historical samples (1986-1993) from the nearest downstream SID (SW027, see Figure 1-1)

Based on these observations, there does not appear to be a near-term risk to surface water quality posed by the plume However, surface water sampling will be conducted by bracketing the east and west plume boundaries with upstream (background) and downstream stations in both the SID and Woman Creek to verify that the downgradient extent and concentrations do not impact surface water quality Details on

sampling locations and frequencies can be found in the *Sampling and Analysis Plan for Groundwater Monitoring at the 903 Pad/Ryan's Pit VOC Plume* (RMRS, March 1999a)

Table 1-1 contains the Rocky Flats Cleanup Agreement (RFCA) (DOE, 1996) surface water action levels for Segment 5 for the contaminants of concern These action levels are applicable at the point of evaluation, Pond C-2

Table 1-1 RFCA Surface Water Action Levels for Segment 5 for the 903 PAD/Ryan's Pit Plume Contaminants of Concern

Compound	Surface Water Action Levels (µg/l)
Carbon Tetrachloride	5
Cis-1,2-Dichloroethene	70
Methylene Chloride	5
Tetrachloroethene	5
Trichloroethene	5

1 2 PROJECT APPROACH

The proposed action requires the installation and periodic sampling of three groundwater-monitoring wells near the leading downgradient edge of the 903 Pad/Ryan's Pit Plume One well will replace Temporary Well 01298 (see Figure 1-1) since a permanent well is needed for long-term monitoring Two wells will be placed downgradient These wells will be placed in downgradient locations with the greatest groundwater flux The locations for the downgradient wells will be based on data collected from the planned Geoprobe® (direct-push sampler) boreholes Well depths will be approximately 10 to 20 feet depending on the location Geoprobe® holes are an effective way to determine the hydrogeology of multiple locations so that wells are not placed in dry areas or areas with low groundwater fluxes Sampling and reporting activities will be integrated with activities under the Integrated Monitoring Plan (IMP) Additional details of this approach can be found in Section 3 0

2 0 PROJECT DESCRIPTION

This section provides a brief project background and data summary along with a description of the hydrogeologic setting and existing site conditions More detailed information can be found in

- *Sampling and Analysis Plan, Characterization of the 903 Pad/Ryan's Pit and East Trenches Plumes,* (IT Corp , 1998b),
- *Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site* (EG&G, 1995b),
- *Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI) Report, 903 Pad, Mound, and East Trenches Area, OU 2,* (DOE 1995), and,
- *Historical Release Report* (HRR) (DOE, 1992)

2 1 BACKGROUND

Two nearby VOC sources contribute to the 903 Pad/Ryan's Pit Plume, the 903 Pad and farther south, Ryan's Pit (Figure 1-1) The 903 Pad area was used to store drums that contained radioactively contaminated oils and VOCs from the summer of 1958 to January 1967 Approximately three-quarters of the drums contained plutonium-contaminated liquids while most of the remaining drums contained uranium-contaminated liquids Of the drums containing plutonium, the liquid was primarily lathe coolant and carbon tetrachloride in varying proportions Also stored in the drums were hydraulic oils, vacuum pump oil, trichloroethene, tetrachloroethene, silicone oils, and acetone still bottoms

Leaking drums were noted in 1964 during routine handling operations The contents of the leaking drums were transferred to new drums, and the area was fenced to restrict access When cleanup operations began in 1967, a total of 5,237 drums were at the drum storage site Approximately 420 drums leaked to some degree Of these, an estimated 50 drums had leaked their entire contents The total amount of leaked material was estimated at around 5,000 gallons of contaminated liquid containing approximately 86 grams of plutonium From 1968 through 1969, some of the radiologically contaminated material was removed, the surrounding area was regraded, and much of the area was covered with clean road base and an asphalt cap Because of the high concentrations of VOCs present in the groundwater (greater than 1% of the chemical's solubility), dense, non-aqueous phase liquids (DNAPLs) are suspected to exist underneath the 903 Pad RFETS has scheduled remediation of the 903 Pad including source removal, to begin in 2001

Ryan's Pit is located approximately 150 feet south of the 903 Pad and is approximately 20 feet long, 10 feet wide, and 5 feet deep Ryan's Pit was used as a waste disposal site starting in 1969 and for nonradioactive liquid chemical disposal starting in 1971 Use of the pit ceased in 1971 VOCs disposed at this location include tetrachloroethene, trichloroethene, and carbon tetrachloride In addition to VOC disposal, paint thinner and small quantities of construction-related chemicals may also have been placed in Ryan's Pit According to historical data, only liquids were put into the pit, and their containers were either reused or disposed in other areas (DOE, 1992)

Source removal activities for Ryan's Pit began in September 1995 with removal of contaminated soils and was completed in August 1996 Along with degraded drums and plutonium-contaminated soils, free-phase tetrachloroethene and motor fuel constituents were found during this removal action One hundred and eighty cubic yards of source material were removed in this action (RMRS, 1997a)

2 2 HYDROGEOLOGIC SETTING

RFETS is situated at the margin of a gently eastward sloping topographic and bedrock pediment surface mantled by unconsolidated Pleistocene Rocky Flats Alluvium and underlain mainly by claystones, siltstones, and sandstones of the Cretaceous Arapahoe and Laramie Formations (EG&G, 1995a) East of this margin, colluvium-covered hillslopes dominate the landscape, except along valley bottoms where valley-fill alluvial deposits occupy the major stream courses

The Rocky Flats Alluvium is comprised chiefly of poorly sorted, clayey gravels and sands with abundant cobble and boulder-sized material and discontinuous lenses of clay, silt, and sand Hillside colluvial deposits are markedly finer-grained in texture, being comprised of clay, clayey gravels, and lesser amounts of sand and silt These deposits were derived from geologic material exposed on the steep slopes and topographic highs, and were formed by slope wash, downslope creep, and landslide action Valley-fill deposits were fluvially derived from upstream materials, and consist of clay, silt, and sand with lenses of gravel These deposits occur along the drainage bottoms in and adjacent to stream beds, and are most common in the eastern portions of RFETS

The Arapahoe Formation is 0 to 50 feet thick at RFETS and consists mainly of a discontinuous, but mappable, fine- to medium-grained, moderately- to poorly- sorted sandstone unit that forms the uppermost sandstone of significant lateral extent This sandstone unit is referred to as the Arapahoe Formation (or No 1) Sandstone (EG&G, 1995a) and is known to locally subcrop beneath the Rocky Flats Alluvium and colluvium in the 903 Pad, East Trench and other areas of the eastern Industrial Area It has been shown to be an important pathway for the lateral transport of contaminated groundwater to hillslopes in other areas of the Site (i e , South Walnut Creek)

The Laramie Formation conformably underlies the Arapahoe Formation and consists primarily of massive claystone and siltstone with discontinuous clayey sandstone units (EG&G, 1995a) Unlike the Arapahoe Formation sandstone, these sandstone units exhibit lithologic and hydrologic characteristics (i e , high matrix clay content and low permeability) that are not indicative of contaminant pathways These lenticular Laramie Formation sandstones are texturally distinct from the Arapahoe Formation sandstone by virtue of their high silt and clay content (EG&G, 1995a)

The 903 Pad is located southeast of the Industrial Area of RFETS on the flat surface at the southern edge of a pediment A south facing hillside slopes downward from the 903 Pad to the SID and Woman Creek Ryan's Pit is located on the hillside to the south of the 903 Pad In the 903 Pad area, the Rocky Flats Alluvium is 10 feet thick at the northwest corner of the Pad which is near a bedrock high, and 25 feet thick at the southeast corner which is within a bedrock channel The sitewide geometric mean of the Flats Alluvium hydraulic conductivity is 6×10^{-4} centimeters/second The Rocky Flats Alluvium is truncated by erosion and does not extend to Ryan's Pit At Ryan's Pit and further downslope toward Woman Creek, surficial deposits principally consist of clay-rich colluvium and reworked Rocky Flats Alluvium Caliche is common in both the alluvium and colluvium Groundwater at Ryan's Pit is between 3 to 10 feet below ground surface There are numerous slump features in this area and a large scarp face is located between the 903 Pad and Ryan's Pit

Bedrock in the 903 Pad and Ryan's Pit area is primarily composed of weathered claystone of the Arapahoe and Laramie Formations In addition, the Arapahoe No 1 Sandstone subcrops under the alluvium at two locations, west of and southeast of the 903 Pad The subcropping to the southeast is in the 903 Pad/Ryan's Pit Plume Because this subcrop is in the path of groundwater flow, it could affect the flow and transport of contaminants of concern in this area The downgradient Geoprobe® borings placed in 1998 did not encounter sandstone as a subcropping

12

The 903 Pad/Ryan's Pit Plume is defined as the lobe of contaminated groundwater that flows southward from the two source areas toward the SID and Woman Creek drainage The contaminants of concern are carbon tetrachloride, methylene chloride, cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene Most of the groundwater does not daylight in this area, however, below the SID there are a number of seeps The lobe of contaminated groundwater which flows eastward from the 903 Pad is further addressed in the East Trenches Plume Decision Document (RMRS, 1999b)

The groundwater contaminant plume from the 903Pad/Ryan's Pit areas is primarily confined to the upper hydrostratigraphic unit (UHSU) which consists of Rocky Flats Alluvium, colluvium, and the weathered bedrock Groundwater occurrence in the UHSU deposits on the 903 Pad/Ryan's Pit hillslope is controlled by a local hydrogeologic setting that results in limited availability of water for plume migration The south-facing hillslopes of major drainages generally receive smaller amounts of recharge than do the north-facing slopes because of slope aspect effects (i e , higher evaportranspiration demands) and a regional Rocky Flats Alluvial groundwater flow direction to the northeast that favors discharge to north-facing hillslopes In the 903 Pad/Ryan's Pit Plume area, the main sources of colluvial UHSU groundwater include subsurface discharge from the Rocky Flats Alluvium and isolated bedrock sandstone units, and infiltration of incident precipitation, especially during the Spring months High on the hillslope, groundwater is discharged from the Rocky Flats Alluvium and a subcropping sandstone (Arapahoe Formation sandstone) to the colluvium at a seep complex found near the pediment rim extending from the southern edge of the 903 Pad to the former 903 hillside soil study area Midslope sources of groundwater are mainly limited to precipitation and subcropping Laramie sandstones and siltstones, such as found at well 1487, which generally tend to be poor producers of water Given the complexity of the hillside flow regime, it is expected that colluvial groundwater may also interact dynamically with the underlying weathered bedrock, with flow entering and exiting the bedrock in accordance with the pathway-of-least-resistance principle

The location specific slump blocks is not possible to determine with the available data The whole hillside is colluvium and therefore, represents many years of soil movement downslope Rather than focus on how these movements have impacted groundwater, the approach has been to determine where groundwater flows so that all paths between the source area and surface water are identified Although upgradient effects, such as low permeabilities and discontinuities in the geology, can retard and attenuate contaminants, it will be the change in contaminant concentrations over time in wells downgradient that will determine whether attenuating effects are actually protective of surface water

Groundwater on the 903 Pad/Ryan's Pit hillside flows downslope from north to south in a direction that approximates the surface topography On a local scale, flow is expected to follow preferential pathways that may deviate significantly from expected pathways inferred from surface topography alone Figure 1-3 illustrates the configuration of the bedrock surface based on the results of the pre-remedial field investigation (IT, 1998a) Spatial variations in the bedrock topographic configuration combined with zones of enhanced permeability created by landslide slip planes and lithologic heterogeneity are presumed to account for much of the irregularity indicated by the field data Likewise, bedrock topography and the identified preferential pathways appear to be controlling seep locations as can be seen in Figure 1-20 These conditions, combined with the low to moderate permeabilities of colluvium and weathered bedrock, suggest that low groundwater flow rates are prevalent in the saturated areas of the 903 Pad/Ryan's Pit hillslope For the saturated area extending from wells 01298 to 01798, IT (1998a) estimated a groundwater flow rate of approximately 8 cubic feet per day (or 60 gallons per day) most of which occurs primarily along colluvial pathways This flow rate results in a correspondingly low contaminant flux based on contaminant concentrations detected during the pre-remedial investigation The calculated total VOC contaminant flux for the distal end of the 903 Pad/Ryan's Pit Plume is estimated at 0 13 grams per day (IT, 1998a)

2 3 PREVIOUS INVESTIGATIONS

Subsurface investigations, which encompassed the 903 Pad/Ryan's Pit plume, were underway as early as 1987 and include the OU 2 RCRA Facility Investigation/Remedial Investigation (RFI/RI) A 1998 investigation was implemented to provide the information necessary to design a groundwater collection and treatment system The following information is derived from recent summaries of those investigations (DOE, 1995, RMRS, 1997b)

As summarized in Section 2 2, contaminated groundwater in the 903 Pad and Ryan's Pit area is primarily confined to the UHSU Fifty-seven VOCs have been detected in groundwater of the UHSU, of these the contaminants of concern are carbon tetrachloride, methylene chloride, cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene In the source areas, total VOCs in the groundwater are approximately 5,000 micrograms per liter (µg/l) near the 903 Pad and approximately 57,000 µg/l near Ryan's Pit The maximum concentrations of many VOC contaminants in the former OU 2 area are located within this plume The highest concentration of tetrachloroethene (150,000 µg/l) was detected immediately downgradient of Ryan's Pit A well installed through the center of the 903 Pad had groundwater concentrations of carbon tetrachloride at 20,000 µg/l, chloroform at 39,000 µg/l and methylene chloride at 35,000 µg/l A well installed at the northeast corner of the 903 Pad detected tetrachloroethene at 14,000 µg/l (DOE, 1995) The apparent extent of the VOC plumes from the 1996 Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report (RMRS, 1997b) are shown in Figures 2-1, 2-2, 2-3, and 2-4

Migration into the Arapahoe Sandstone appears to be limited due to the lithology underlying the alluvium The nearest subcropping of the Arapahoe No 1 Sandstone is adjacent to the west edge of the 903 Pad Because this subcropping occurs upgradient of the source area, the plume has had less impact to the sandstone than to other stratigraphic units This is evidenced by a total VOC concentration in the sandstone subcropping of approximately 2,500 µg/l Downgradient migration into the Arapahoe No 1 Sandstone is potentially limited by an indicated bedrock fault that runs from the northeast to the southwest across the hillside (just southeast of the 903 Pad) Due to this fault, the bedrock including Arapahoe No 1 Sandstone is lower on the downgradient side than the upgradient side Because there are not any subcroppings of Arapahoe No 1 Sandstone between the fault and the source areas migration through the Arapahoe No 1 Sandstone is not likely near the source area However, downgradient of the fault, there are subcropping that could allow downgradient migration into the Arapahoe Sandstone farther away from the source area Well No 1487 is screened into Arapahoe No 1 Sandstone and contains contaminants (see Appendix A), however, it is not known whether these contaminants can be specifically attributed to horizontal movement in the Arapahoe No 1 Sandstone or through vertical migration from the colluvium Cross-Sections in Appendix B show how the sandstone may cause some vertical plume migration Additional maps can be found in the sitewide geologic characterization report (EG&G, 1995a) It is possible that claystone and silty claystone in the underlying bedrock have acted as a low permeability barrier, preventing significant quantities of contaminants from reaching the No 1 Arapahoe Sandstone

As expected, concentrations in the distal end of the plume are lower The concentrations of contaminants of concern in groundwater from pre-1998 wells located near the 903 Pad/Ryan's Pit downgradient plume boundary are provided in Table 2-1 and shown in Figure 2-5 (see Appendix A for detailed historical analytical data for the area wells)

In March and April of 1998, a series of direct push (Geoprobe®) borings were installed between the existing wells listed in Table 2-1 and the SID which is the nearest occurrence of surface water to the plume (see Figure 2-5) The boreholes were placed in a line parallel to the SID to delineate the leading edge of the plume The boreholes were completed as temporary wells with a ¾ inch casing and screen

intervals of about five feet The hydrogeologic cross sections through these boreholes are presented in Appendix B Groundwater levels were generally checked within one day of well installation

The upper strata of unconsolidated sediments in these borings consisted of colluvium of various lithologies, principally silty clays and clayey silts, sometimes containing sand particles Lenses of coarser, subangular to subrounded sands and gravels were occasionally encountered Bedrock consists of a grayish-brown massive claystone identified by a lack of coarse-grained material The claystone varied from moist to very dry, often becoming drier with depth In places, the claystone also contained abundant caliche

Table 2-1 Downgradient Groundwater Concentrations for Contaminants of Concern – 903 Pad/Ryan's Pit Plume

Contaminant	Well 6286	Well 6386	Well 1487	Well 23196	Well 01291	Well 2987	Well 3087	RFCA Tier II Groundwater Action Levels
Carbon Tetrachloride	8	ND	460	ND	15	ND	ND	5
Cis-1,2-Dichloroethene	ND	ND	ND	ND	0 2	ND	ND	70
Methylene Chloride	ND	ND	ND	ND	0 5	2	ND	6
Tetrachloroethene	ND	ND	8	ND	2	ND	ND	5
Trichloroethene	0 8	ND	190	ND	12	ND	ND	5

Note all values are maximum concentrations (µg/l) from 1996 sampling of monitoring wells, ND indicates not detected or below detection limit (RMRS, 1997b)

The depth to bedrock varied from 2 6 feet in temporary well 02198 to 18 8 feet in temporary well 01198 The bedrock surface slopes to the southeast, in broad conformance with the surficial topography Along the line of Geoprobe® borings, localized bedrock lows occur at borings 00598, 01298, 01498, and 01698, possibly indicating the presence of south-trending preferential flow pathways (Figure 1-2) A sequence of highly weathered claystone overlying sandy silt also suggests the possibility of a slump block at this location

Preliminary VOC analytical results for soils from the 1998 borings are presented in Table 2-2 Data validation of 25% of the data set has not been completed Low concentrations of VOCs, primarily acetone, were detected in several of the borings The maximum concentration of acetone was 0 072 milligram per kilogram (mg/kg) in boring 01798 is below RFCA Tier I Subsurface Soil Action Levels The appearance of acetone in dry boreholes and boreholes away from the plume might be due to laboratory contamination since it is a common cross-contaminant The only contaminants of concern detected were carbon tetrachloride and trichloroethene in boring 01298 below RFCA Tier I Subsurface Soil Action Levels All other detected VOCs were below the RFCA Tier I Subsurface Soil Action Levels, which included 1,2,4-trimethylbenzene and naphthalene in boring 02098 The traces of chlorinated VOCs in 01298 soils coincide with the highest groundwater concentrations encountered in this investigation

Groundwater was encountered in only eight of the 26 wells installed in the study area The six westernmost wells of the alignment were dry (Figure 2-5) To the east, groundwater was intermittently encountered in the wells with the water table generally occurring within weathered bedrock The water table slopes to the southeast, in general conformance with surficial and bedrock topography During measurements made on June 18, 1998, the water table was observed within the colluvium in only three wells marked by locally low bedrock (01298, 01498, and 01698), with approximately three feet or less of saturated colluvium (Figure 2-5) Available data from these wells indicate that contaminated groundwater might eventually discharge to the SID and/or Woman Creek Sampling and analysis of the groundwater in the temporary wells was performed in accordance with the Sampling and Analysis Plan (SAP), Characterization of the 903 Pad/Ryan's Pit and East Trenches Plume (IT Corp , 1998b), and the appropriate RFETS Standard Operating Procedures referenced in the SAP

15

Six of the 26 temporary wells installed had sufficient water to sample Preliminary concentrations of VOCs in groundwater observed during the plume characterization investigation are presented in Table 2-3 Concentrations of three contaminants of concern (carbon tetrachloride, tetrachloroethene, and trichloroethene) are also plotted in Figure 2-5 VOCs were detected in five of the six temporary wells The VOC concentrations in these five wells exceeded one or more Tier II Groundwater Action Levels (MCLs) Tier I Groundwater Action Levels (100 times MCLs) were not exceeded in any of the wells In addition to the three main plume constituents, detected compounds include methylene chloride, chloroform, tetrachloroethene, cis-1,2-dichloroethene, and naphthalene The plume is bounded on the west end by numerous dry wells and on the east end by several dry wells and one well, 01998, in which VOCs were not detected

Table 2-2 Plume Characterization Sampling - Subsurface Soil Contaminants (mg/kg) and Corresponding RFCA Tier I Subsurface Soil Action Levels

Borehole Identification	Sampled Interval (ft bgs)	Water-Level Elevation (feet)	Acetone (mg/kg)	Carbon Tetrachloride (mg/kg)	Trichloroethene (mg/kg)
RFCA Tier I Subsurface Soil Action Level			2,740	11	9 27
00198	14 2 – 14 5	Dry	ND	ND	ND
00298	7 4 – 7 9	Dry	ND	ND	ND
00398	10 6 – 11 4, 14 8	Dry	ND	ND	ND
00498	11 0 – 11 6	Dry	ND	ND	ND
00598	14 0 – 14 6	Dry	ND	ND	ND
00698	13 8 - 14 7	Dry	ND	ND	ND
00798	9 0 – 10 0	Dry	0 007	ND	ND
00898	13 0 – 14 0	Dry	ND	ND	ND
00998	7 3 – 7 8	5850 47	ND	ND	ND
01098	10 0 - 10 9	Dry	ND	ND	ND
01198	16 0 – 17 8	Dry	ND	ND	ND
01298	13 3 – 14 0	5840 43	ND	0 002J	0 005J
01398	4 4 – 6 5	5841 85	ND	ND	ND
01498	5 0 – 5 6	5840 16	ND	ND	ND
01598	6 6 – 7 0	Dry	ND	ND	ND
01698	14 7 – 15 5	5839 79	ND	ND	ND
01798	4 3 – 5 2	5840 18	0 072	ND	ND
01898	3 4 – 4 5	Dry	0 010	ND	ND
01998	2 0 – 2 7	Dry	ND	ND	ND
02098	?	Dry	0 020	ND	ND
02198	4 3 – 4 8	Dry	0 002J	ND	ND
02298	3 3 – 4 2	Dry	ND	ND	ND
03998	3 0 - 4 7	Dry	0 006	ND	ND
04098	4 9 – 5 5	Dry	ND	ND	ND
04198	Not sampled?	Dry	ND	ND	ND
04298	4 0 – 5 1	Dry	ND	ND	ND

J - estimated value, concentration is below the detection limit
ND – not detectable, below the detection limit of 0 006 mg/kg except for borehole 01598 which had a detection limit of 0 005 mg/kg

16

Table 2-3 Plume Characterization Sampling - Volatile Organic Compounds in Groundwater (µg/l)

Analyte (µg/l)	RFCA Tier II Groundwater Action Level (µg/l)	Well Identification Number					
		01298	01398	01498	01698*	01698*	01798
Methylene Chloride	5	24	10	31			
1,1-Dichloroethene	7	3 J					
Chloroform	100	96	7		73	73	32
Carbon Tetrachloride	5	460 E			150	140	13
Trichloroethene	5	500 E	9		42	40	12
Tetrachloroethene	5	0 023			8	7	2 J
Xylene (total)	100						1 J
cis-1,2-Dichloroethene	70	9			5	5	1 J
Naphthalene	1,460		6		3 J		4 J

* = Duplicate Samples
E = concentration exceeds the instrument calibration range and was diluted
J = result is estimated value below reporting limit
Blank Spaces = Not detected at detection limit of 5 ug/L
Note Table includes only compounds detected in one or more of the samples

2 4 EVIDENCE OF NATURAL ATTENUATION

Natural attenuation processes include "a variety of physical, chemical, and biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume or concentration of contaminants in soil or groundwater" (EPA, 1997) This might include any or all of the following processes

- Chemical Transformation,
- Biodegradation,
- Dilution,
- Dispersion,
- Sorption, and
- Volatilization

There are a number of potential mechanisms that could degrade or limit the mobility of VOCs in the 903 Pad/Ryan's Pit Plume For the 903 Pad/Ryan's Pit Plume, all of these processes could result in significantly lower downgradient contaminant concentrations Physical processes could be as effective as degradation in controlling contaminants Because several of these processes likely apply to the 903 Pad/Ryan's Pit plume the determination of a specific mechanism of attenuation is not critical However, general conclusions regarding the evidence of natural attenuation can be made This evidence is discussed in the following sections

2 4 1 Plume Equilibrium

The low downgradient concentrations encountered during past investigations could be evidence that natural attenuation processes are degrading the contaminants and/or slowing the migration of contaminants The releases that created the plume occurred between 1955 and 1971 (DOE, 1992)

allowing approximately 27 to 43 years for plume migration Well 01487, which is about 60 feet upgradient of the line of 1998 wells and is screened into the Arapahoe No 1 sandstone, shows an apparent trend of increasing carbon tetrachloride and trichloroethene concentrations over time (see Figure 2-6) Concentrations of tetrachloroethene in Well 01487 are near detection limits and appear to have no apparent trend Although Well 01487 is screened into the bedrock, the claystone layer defining the top of bedrock is relatively thin in this area and there is a known subcropping of the more permeable Arapahoe No 1 Sandstone upgradient It is likely that there is good local communication between the groundwater in the colluvium and the sandstone, which could indicate significant mixing across the colluvial/bedrock interface A similar trend analysis can not be done directly on the colluvium until the wells proposed in this technical memorandum are installed and data is collected

The gradual increase in concentration observed in Well 01487 that could indicate that the VOC plume is moving slowly Based on the concentration contaminant of concerns and their respective degradation products in downgradient wells, it appears that the predominant attenuation processes are probably the physical processes that govern the plume migration as opposed to the chemical processes that govern degradation of the contaminants However, the slow rate of plume movement likely enhances degradation processes because the contaminants in the aquifer have a greater residence time to undergo chemical degradation

2 4 2 Degradation Products

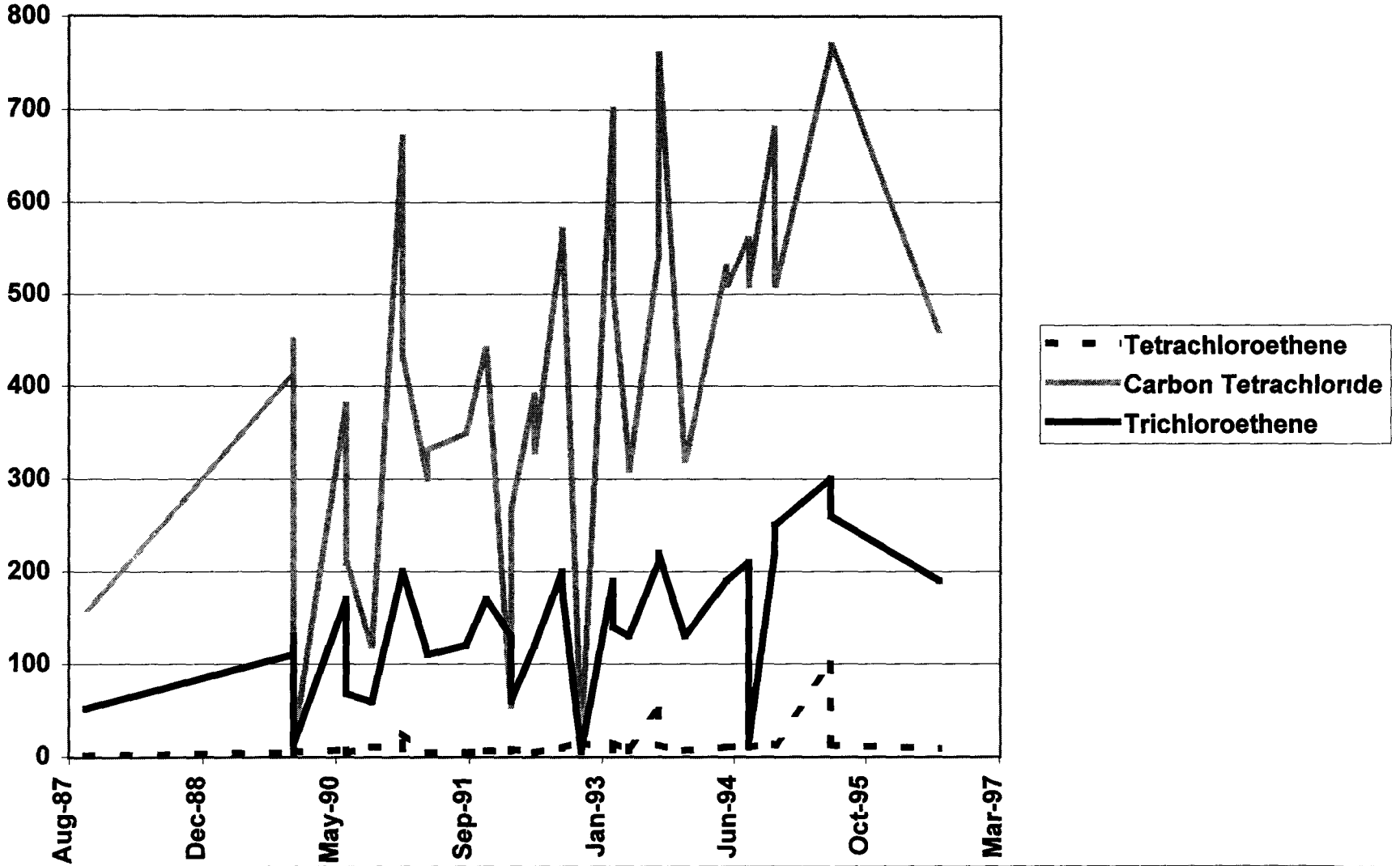
The presence of degradation products is an important indicator of contaminant-destroying chemical and biological processes One difficulty in ascertaining the presence of degradation products is the wide variety of organic solvents known to have been placed into Ryan's Pit (i e expected degradation products could be solvents from the original release) Table 2-4 presents some of the contaminants of concern for the 903 Pad/Ryan's Pit Plume and their associated degradation products

Table 2-4 Key VOCs and Associated Degradation Products in the 903 Pad/Ryan's Pit Plume

Key Contaminant	Degradation Product	Maximum Concentration in 1998 Downgradient Wells (ug/l) *	Maximum Concentration in Well 01487 (ug/l) (1987-1996)
Carbon Tetrachloride		460	770
	Chloroform	96	55
	Methylene Chloride **	31	17
	Chloromethane	Not Detected	Not Detected
1,1,1-Trichloroethane * **		Not Detected	1 06
	1,1–Dichloroethane	Not Detected	Not Detected
	Chloroethane	Not Detected	Not Detected
Trichloroethene		500	300
	Dichloroethene **	9	5
	Vinyl Chloride	Not Detected	Not Detected
Tetrachloroethene		23	15
	Trichloroethene	500	300
	Dichloroethene	9	5
	Vinyl Chloride	Not Detected	Not Detected

* Wells 01298, 01398 01498, 01698 01798 and 01998, maximums based on detection in at least two of these wells
** Dichloroethene and methylene are contaminants of concern and potential degradation products
*** 1 1 1- Trichloroethane was detected in the source area but not the in the 1998 wells

Figure 2-6 VOC Concentration (ug/l) in Well 01487 Versus Time



1,1,1-Trichloroethane was included in the analysis because it is found in Well 07391 in the Ryan's Pit source area Concentrations of up to 1,100 ug/l of 1,1,1-Trichloroethane have been detected in the source area, however it does not appear that it is affecting downgradient groundwater Because of high concentrations in the source area, most of the trichloroethene is probably residual solvent from the source area as opposed to a decay product from tetrachloroethene

Based on Table 2-4, degradation products for three of the contaminants of concern appear to be present in both locations The degradation products found are all consistent with hydrogenolysis as a reductive dechlorination reaction Hydrogenolysis is a destructive hydrogenation reaction where hydrogen replaces the chlorine atom Although these reaction products are strong indicators of reductive dechlorination, the much higher concentrations of the source area contaminants of concern indicate that reductive degradation is not a major factor in limiting the plume movement

2 4 3 Hydrogeologic Factors

Because the study area is poorly saturated and the wells at the west end of the study area were dry (Figure 2-5), it can be concluded that the predominant factor limiting the VOC plume extent appears to be site hydrogeology Groundwater flow is confined to the east side of the study area, possibly because of the effect of past slumping It should be noted that basis for concluding that hydrogeologic factors are a likely influence is not based on a rigorous analysis of the colluvium It is based on the following factors

- The main factor controlling contaminant migration might not be the retardation of contaminant migration but simply a lack of groundwater flow Although there are known impediments to flow upgradient, it is the low overall flux of a groundwater and contaminants toward surface water that suggest that physical factors are attenuating flow

- Upgradient flow in the colluvium could be impeded by the movement of claystone slump blocks across more porous members

- Faulting may have offset the Arapahoe No 1 Sandstone near the source area thereby isolating the contaminant flow in the more shallow zones of contamination from flow in the Arapahoe No 1 Sandstone Contaminants are reaching the No 1 Sandstone farther downgradient near subcrop areas as a result of hydraulic communication with the colluvium

- Flow appears to be channelized downgradient with significant zones in the colluvium that are dry Because of this, the actual contaminant flux is relatively low

- Some dilution could be occurring in both the colluvium and the bedrock from cleaner groundwater north of the plume and incident recharge on the hillside mixing with plume water

Additionally, the bedrock surface is known to have erosional features that will further affect the flow These subsurface features might have lengthened the flow path of the plume and enhanced attenuation of the plume through physical processes The primary flow path for the contaminated groundwater was shown previously on Figure 1-2 This area is also characterized by intermittent seeps from both the bedrock and the alluvium The combination of heterogeneous permeabilities, areas of low permeability and depressions in bedrock could have routed the flow of water to the eastern portion of the study area, farther down the SID, and possibly limited contaminant migration to surface water

2.4.4 Surface Water Quality Impacts

There is no historical evidence of surface water quality impacts from the plume Based on data in the RFETS Soil and Water Database, VOCs have been sporadically detected in the SID at concentrations less than 100 µg/l The source of these contaminants cannot be tied the 903 Pad /Ryan's Pit Plume since VOCs have also been detected in the SID upstream of the plume The downstream sampling station located in the SID where it discharges into C-2 pond (SW027, Figure 1-1) was sampled for VOCs approximately 21 times between 1986 and 1993 During this time period, methylene chloride was measured at concentrations of 14 µg/l or less Carbon tetrachloride, tetrachloroethene, and trichloroethene were at or below their detection limit of 5 µg/l Since methylene chloride is a common laboratory contaminant and because the other contaminants of concern or their degradation products have not appeared in these proximal downstream surface water locations, there is presently not an evident impact to surface water quality Also, further downslope from the SID, the contaminants of concern or degradation products associated with the 903 Pad/Ryan's Pit Plume have not been detected

2 4 5 Conclusions Concerning Natural Attenuation in the 903 Pad/Ryan's Pit Plume

The following conclusions can be made based on existing data

- Concentrations of contaminants at the leading edge of the plume need to be monitored to substantiate the evidence that natural attenuation is occurring, to assess trends in the concentration of VOCs in the groundwater, and to confirm that plume migration is not occurring or that the plume is moving very slowly

- The presence of reductive dechlorination products of the three contaminants of concern suggests that small quantities from the original release might have been degraded The potential degradation products appear to be consistent with the same degradation mechanism, specifically, hydrogenolysis

- Hydrogeologic factors appear to have a greater impact on contaminant migration than degradation processes It is likely that this is attributable to a low overall groundwater flux

- There is no evidence that the 903 Pad/Ryan's Pit Plume is currently impacting surface water quality at this time

3.0 PROPOSED ACTION

Based on a review of existing data, RFETS, EPA, and CDPHE agreed that monitoring would be the best approach for 903 Pad/Ryan's Pit Plume to assess natural attenuation and potential groundwater impacts to surface water quality It is also recognized that source removal at the 903 Pad will address the source area contamination and reduce the influx of additional contaminants into the groundwater

3 1 PROPOSED APPROACH

The overall strategy for 903 Pad/Ryan's Pit Plume is to use the information from the Geoprobe® borings to identify all the potential areas where contaminants are moving toward surface water By using an evenly spaced line of Geoprobe® holes to intercept the downgradient plume, contaminant pathways have been identified without unnecessary holes and extensive analysis to evaluate the upgradient hydrogeology

The proposed approach for monitoring the 903 Pad/Ryan's Pit Plume will be to install four downgradient permanent wells to monitor VOCs One permanent well meeting RFETS monitoring well standards will be placed near Temporary Well 01298 (Figure 1-2) This location was selected based on mass flux calculations (IT, 1998b) presented in Appendix C Based on the 1998 well data, this well consistently had the highest contaminant load for each of the chlorinated solvents thus the greatest contaminant mass flux

Three additional wells will be placed downgradient of the 1998 wells and upgradient of the SID Two wells will be used to monitor the colluvium and one will be screened into the Arapahoe No 1 sandstone The location of these wells will be determined by using the observational approach, i e , Geoprobe® holes will be placed to determine which locations have the greatest groundwater flow based on saturated thickness, hydraulic gradient, bedrock contours, and other hydrogeological attributes Figure 1-2 also shows the general area where Geoprobe® holes will be placed The bedrock well (Arapahoe No 1 sandstone) will be placed near well 90199 since this well is close to well 01487 Prior to performing the fieldwork, an ecological evaluation will be conducted to make sure the work does not result in detrimental ecological effects including impacts to the Preble's Jumping Field Mouse

Geoprobe® locations and permanent wells will be monitored for VOCs All activities will be integrated with existing RFETS monitoring activities under the IMP (Kaiser-Hill, 1997) Monitoring is planned to continue until enough data are collected to establish a trend in downgradient concentrations Further details on data quality objectives, sampling procedures, and analytical methods will be presented in the SAP appendix to the workplan to be developed under the IMP Monitoring will be initially performed quarterly in conjunction with the IMP activities during the first year to optimize the seasonal aspects of water level and VOC concentration variations, while minimizing costs and other resources Subsequent sampling timing and frequency will be specified in the IMP based on the sampling results of the first year The same sampling and analyses methodologies used for monitoring RFCA groundwater wells will be utilized for the 903 Pad/Ryan's Pit Plume wells If at any time during monitoring the monitoring data indicates that the plume could cause surface water concentrations to exceed the values in Table 1-1 at the point of evaluation (SW027), then the approach to 903 Pad/Ryan's Pit Plume will have to be reevaluated

3 2 WORKER HEALTH AND SAFETY

This project falls under the scope of the Occupational Safety and Health Administration (OSHA) construction standard for Hazardous Waste Operations and Emergency Response, 29 Code of Federal Regulations (CFR) 1910 120 Under this standard, the Health and Safety Plan (HASP) currently utilized for groundwater monitoring will be revised, if necessary, to address the safety and health hazards of each phase of monitoring activities and specify the requirements and procedures for employee protection In addition, the DOE Order for Construction Project Safety and Health Management, 5480 9A, applies to this project This order requires the preparation of Activity Hazard Analyses (AHAs) to identify each

27

task, the hazards associated with each task, and the precautions necessary to mitigate the hazards The AHAs will be included in the HASP This project could expose workers to physical and chemical hazards Physical hazards include those associated with use of drilling equipment, noise, heat stress, and cold stress Chemical hazards include exposure to the contaminated groundwater Physical hazards will be mitigated by engineering controls, administrative controls, and appropriate use of personal protective equipment (PPE) Chemical hazards will be mitigated by the use of PPE and administrative controls Appropriate skin and respiratory PPE will be worn throughout the project Routine VOC monitoring will be conducted with an organic vapor monitor

If unanticipated hazards or conditions are encountered during this project in accordance with RMRS policy (Directive-001), the project activities will pause to assess the potential hazard or condition to determine whether work can proceed with existing safety controls If field conditions or hazards vary from the planned approach and it is determined that work can be done safely, an AHA will be prepared or modified to address the unexpected circumstances, and work will proceed according to the appropriate control measures Data and safety controls will be continually evaluated Field radiological screening will be conducted as appropriate using radiological instruments appropriate to detect surface contamination and airborne radioactivity As required by 10 CFR 835, Radiation Protection of Occupational Workers, all applicable implementing procedures will be followed to insure protection of the workers, collocated workers, the public, and the environment The HASP will describe the air monitoring to be used to monitor for radiation, VOCs, and particulate, as appropriate If necessary, air monitoring will be performed in accordance with applicable procedures, which includes perimeter Radioactive Ambient Air Monitoring Program (RAAMP) monitoring throughout the project duration Air monitoring activities may vary and are dependent on field activities

3 3 WASTE MANAGEMENT

Waste anticipated from drilling and sampling include drill cuttings, purge water, PPE, and development water from well installation All wastes will be managed in accordance with the RFETS standard operating procedure, Field Operations (FO) 29, for IDM under the existing IDM program Wastes generated, as part of this proposed action, will be characterized based on process knowledge, analytical results, and radiological screening Based on FO 29, wastes, such as PPE, identified as non-radiological and non-hazardous will be disposed in a sanitary landfill Purge water will be treated at the 891 Consolidated Water Treatment Facility

4.0 IMPLEMENTATION SCHEDULE

Well installation is scheduled to be completed in Fiscal Year 1999 The downgradient monitoring of the 903 Pad/Ryan's Pit Plume is scheduled to commence in the Fiscal Year 1999 on a quarterly basis for the first year Subsequent sampling timing and frequency will be specified in the IMP based on the sampling results for the first year

5.0 REFERENCES

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RMRS, 1997b, 1996 *Annual Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report for Rocky Flats Environmental Technology Site*, RF/RMRS-97-087 UN, November

RMRS, 1999a, *Sampling and Analysis Plan for Groundwater Monitoring at the 903 Pad/Ryan's Pit VOC Plume Draft Final* RF/RMRS-99-312, Revision 0, March

RMRS, 1999b, *Final Proposed Action Memorandum for the East Trenches Plume*, RF/RMRS-98-258 UN, February

Appendix A

Historical Analytical Data

For 903 Pad/Ryan's Pit Plume

Area Wells

Groundwater Results

for

Well 0491

Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	12/20/91	REAL	CYANIDE	1 5	ug/L	B	10
00491	5/20/92	REAL	CYANIDE	2 3	ug/L	B	10
00491	11/10/92	REAL	CYANIDE	2 5	ug/L	B	10
00491	11/10/92	REAL	CARBON TETRACHLORIDE	240	ug/L	D	0 4
00491	5/19/94	REAL	CARBON TETRACHLORIDE	220	ug/L	D	0 3
00491	11/16/94	REAL	CARBON TETRACHLORIDE	100	ug/L	D	0 3
00491	11/10/92	REAL	CHLOROFORM	91	ug/L	D	0 1
00491	5/19/94	REAL	CHLOROFORM	100	ug/L	D	0 2
00491	11/16/94	REAL	CHLOROFORM	68	ug/L	D	0 2
00491	11/10/92	REAL	cis-1,2-DICHLOROETHENE	12	ug/L	D	0 2
00491	11/10/92	REAL	cis-1,2-DICHLOROETHENE	12	ug/L	D	0 2
00491	5/19/94	REAL	cis-1,2-DICHLOROETHENE	17	ug/L	D	0 2
00491	5/19/94	REAL	cis-1,2-DICHLOROETHENE	17	ug/L	D	0 2
00491	11/16/94	REAL	cis-1,2-DICHLOROETHENE	11	ug/L	D	0 2
00491	11/16/94	REAL	cis-1,2-DICHLOROETHENE	11	ug/L	D	0 2
00491	11/16/94	REAL	METHYLENE CHLORIDE	0 9	ug/L	D	0 2
00491	11/10/92	REAL	TETRACHLOROETHENE	28	ug/L	D	0 2
00491	5/19/94	REAL	TETRACHLOROETHENE	30	ug/L	D	0 2
00491	11/16/94	REAL	TETRACHLOROETHENE	18	ug/L	D	0 2
00491	11/10/92	REAL	TRICHLOROETHENE	93	ug/L	D	0 2
00491	11/10/92	REAL	TRICHLOROETHENE	93	ug/L	D	0 2
00491	5/19/94	REAL	TRICHLOROETHENE	97	ug/L	D	0 2
00491	5/19/94	REAL	TRICHLOROETHENE	97	ug/L	D	0 2
00491	11/16/94	REAL	TRICHLOROETHENE	59	ug/L	D	0 2
00491	11/16/94	REAL	TRICHLOROETHENE	59	ug/L	D	0 2
00491	2/28/92	REAL	CARBON TETRACHLORIDE	72	ug/L	E	0 02
00491	5/20/92	REAL	CARBON TETRACHLORIDE	460	ug/L	E	0 02
00491	9/1/92	REAL	CARBON TETRACHLORIDE	500	ug/L	E	1 4
00491	9/1/92	REAL	CARBON TETRACHLORIDE	69	ug/L	E	0 14
00491	11/10/92	REAL	CARBON TETRACHLORIDE	250	ug/L	E	0 4
00491	5/19/94	REAL	CARBON TETRACHLORIDE	210	ug/L	E	0 3

Analytical Data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	11/16/94	REAL	CARBON TETRACHLORIDE	92	ug/L	E	0 3
00491	2/28/92	REAL	CHLOROFORM	44	ug/L	E	0 01
00491	5/20/92	REAL	CHLOROFORM	36	ug/L	E	0 01
00491	9/1/92	REAL	CHLOROFORM	150	ug/L	E	0 15
00491	11/10/92	REAL	CHLOROFORM	110	ug/L	E	0 1
00491	9/1/92	REAL	cis-1,2-DICHLOROETHENE	23	ug/L	E	0 16
00491	9/1/92	REAL	cis-1,2-DICHLOROETHENE	23	ug/L	E	0 16
00491	5/20/92	REAL	METHYLENE CHLORIDE	39	ug/L	E	0 01
00491	2/28/92	REAL	TETRACHLOROETHENE	47	ug/L	E	0 02
00491	5/20/92	REAL	TETRACHLOROETHENE	45	ug/L	E	0 02
00491	9/1/92	REAL	TETRACHLOROETHENE	57	ug/L	E	0 14
00491	2/28/92	REAL	TRICHLOROETHENE	55	ug/L	E	0 03
00491	2/28/92	REAL	TRICHLOROETHENE	55	ug/L	E	0 03
00491	5/20/92	REAL	TRICHLOROETHENE	44	ug/L	E	0 03
00491	5/20/92	REAL	TRICHLOROETHENE	44	ug/L	E	0 03
00491	9/1/92	REAL	TRICHLOROETHENE	160	ug/L	E	0 28
00491	9/1/92	REAL	TRICHLOROETHENE	160	ug/L	E	0 28
00491	11/10/92	REAL	TRICHLOROETHENE	130	ug/L	E	0 2
00491	11/10/92	REAL	TRICHLOROETHENE	130	ug/L	E	0 2
00491	11/16/94	REAL	1,1,1-TRICHLOROETHANE	0 2	ug/L	J	0 2
00491	11/24/97	REAL	cis-1,2-DICHLOROETHENE	8 93	UG/L	J	5
00491	11/24/97	REAL	cis-1,2-DICHLOROETHENE	8 93	UG/L	J	5
00491	9/12/96	REAL	METHYLENE CHLORIDE	3	ug/L	J	5
00491	11/24/97	REAL	TETRACHLOROETHENE	17 2	UG/L	J	5
00491	12/20/91	REAL	1,1,1-TRICHLOROETHANE	1 98	ug/L		0 01
00491	2/28/92	REAL	1,1,1-TRICHLOROETHANE	2 1	ug/L		0 01
00491	5/20/92	REAL	1,1,1-TRICHLOROETHANE	2	ug/L		0 01
00491	9/1/92	REAL	1,1,1-TRICHLOROETHANE	2	ug/L		0 2
00491	11/10/92	REAL	1,1,1-TRICHLOROETHANE	0 8	ug/L		0 2
00491	12/20/91	REAL	1,1-DICHLOROETHANE	0 32	ug/L		0 03
00491	9/1/92	REAL	1,1-DICHLOROETHANE	0 3	ug/L		0 1

Analytical Data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	12/20/91	REAL	1,1-DICHLOROETHENE	0 35	ug/L		0 04
00491	2/28/92	REAL	1,1-DICHLOROETHENE	0 5	ug/L		0 04
00491	9/1/92	REAL	1,1-DICHLOROETHENE	1	ug/L		0 1
00491	11/10/92	REAL	1,1-DICHLOROETHENE	0 4	ug/L		0 3
00491	5/20/92	REAL	2,2-DICHLOROPROPANE	9 7	ug/L		0 05
00491	12/20/91	REAL	BROMOCHLOROMETHANE	6 1	ug/L		0 01
00491	12/20/91	REAL	BROMODICHLOROMETHANE	0 71	ug/L		0 1
00491	5/20/92	REAL	BROMODICHLOROMETHANE	1 6	ug/L		0 1
00491	12/20/91	REAL	CARBON TETRACHLORIDE	52 2	ug/L		0 02
00491	2/28/92	REAL	CARBON TETRACHLORIDE	440	ug/L		0 02
00491	5/20/92	REAL	CARBON TETRACHLORIDE	500	ug/L		0 02
00491	9/1/92	REAL	CARBON TETRACHLORIDE	440	ug/L		14
00491	3/10/93	REAL	CARBON TETRACHLORIDE	220	ug/L		0 2
00491	5/11/93	REAL	CARBON TETRACHLORIDE	310	ug/L		0 2
00491	8/31/93	REAL	CARBON TETRACHLORIDE	260	ug/L		0 2
00491	12/8/93	REAL	CARBON TETRACHLORIDE	110	ug/L		0 2
00491	3/4/94	REAL	CARBON TETRACHLORIDE	120	ug/L		0 3
00491	8/18/94	REAL	CARBON TETRACHLORIDE	380	ug/L		0 3
00491	3/28/95	REAL	CARBON TETRACHLORIDE	73	ug/L		0 3
00491	9/12/96	REAL	CARBON TETRACHLORIDE	180	ug/L		5
00491	2/11/97	REAL	CARBON TETRACHLORIDE	99	ug/L		5
00491	11/24/97	REAL	CARBON TETRACHLORIDE	120	UG/L		5
00491	12/20/91	REAL	CHLOROFORM	30	ug/L		0 01
00491	2/28/92	REAL	CHLOROFORM	108	ug/L		0 01
00491	5/20/92	REAL	CHLOROFORM	113	ug/L		0 01
00491	5/20/92	REAL	CHLOROFORM	110	ug/L		0 01
00491	9/1/92	REAL	CHLOROFORM	140	ug/L		1 5
00491	3/10/93	REAL	CHLOROFORM	100	ug/L		0 1
00491	5/11/93	REAL	CHLOROFORM	110	ug/L		0 1
00491	8/31/93	REAL	CHLOROFORM	120	ug/L		0 1
00491	12/8/93	REAL	CHLOROFORM	80	ug/L		0 1

Analytical Data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

35

Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	3/4/94	REAL	CHLOROFORM	78	ug/L		0 2
00491	5/19/94	REAL	CHLOROFORM	100	ug/L		0 2
00491	8/18/94	REAL	CHLOROFORM	120	ug/L		0 2
00491	11/16/94	REAL	CHLOROFORM	63	ug/L		0 2
00491	3/28/95	REAL	CHLOROFORM	57	ug/L		0 2
00491	9/12/96	REAL	CHLOROFORM	66	ug/L		5
00491	2/11/97	REAL	CHLOROFORM	62	ug/L		5
00491	11/24/97	REAL	CHLOROFORM	42 1	UG/L		5
00491	12/20/91	REAL	cis-1,2-DICHLOROETHENE	11 6	ug/L		0 03
00491	12/20/91	REAL	cis-1,2-DICHLOROETHENE	11 6	ug/L		0 03
00491	2/28/92	REAL	cis-1,2-DICHLOROETHENE	18	ug/L		0 03
00491	2/28/92	REAL	cis-1,2-DICHLOROETHENE	18	ug/L		0 03
00491	2/28/92	REAL	cis-1,2-DICHLOROETHENE	15	ug/L		0 03
00491	2/28/92	REAL	cis-1,2-DICHLOROETHENE	15	ug/L		0 03
00491	5/20/92	REAL	cis-1,2-DICHLOROETHENE	18	ug/L		0 03
00491	5/20/92	REAL	cis-1,2-DICHLOROETHENE	18	ug/L		0 03
00491	11/10/92	REAL	cis-1,2-DICHLOROETHENE	15	ug/L		0 2
00491	11/10/92	REAL	cis-1,2-DICHLOROETHENE	15	ug/L		0 2
00491	3/10/93	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		0 2
00491	3/10/93	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		0 2
00491	5/11/93	REAL	cis-1,2-DICHLOROETHENE	16	ug/L		0 2
00491	5/11/93	REAL	cis-1,2-DICHLOROETHENE	16	ug/L		0 2
00491	8/31/93	REAL	cis-1,2-DICHLOROETHENE	19	ug/L		0 2
00491	8/31/93	REAL	cis-1,2-DICHLOROETHENE	19	ug/L		0 2
00491	12/8/93	REAL	cis-1,2-DICHLOROETHENE	10	ug/L		0 2
00491	12/8/93	REAL	cis-1,2-DICHLOROETHENE	10	ug/L		0 2
00491	3/4/94	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		0 2
00491	3/4/94	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		0 2
00491	5/19/94	REAL	cis-1,2-DICHLOROETHENE	17	ug/L		0 2
00491	5/19/94	REAL	cis-1,2-DICHLOROETHENE	17	ug/L		0 2
00491	8/18/94	REAL	cis-1,2-DICHLOROETHENE	23	ug/L		0 2

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Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	8/18/94	REAL	cis-1,2-DICHLOROETHENE	23	ug/L		0 2
00491	11/16/94	REAL	cis-1,2-DICHLOROETHENE	10	ug/L		0 2
00491	11/16/94	REAL	cis-1,2-DICHLOROETHENE	10	ug/L		0 2
00491	3/28/95	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		0 2
00491	3/28/95	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		0 2
00491	9/12/96	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		5
00491	9/12/96	REAL	cis-1,2-DICHLOROETHENE	12	ug/L		5
00491	2/11/97	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		5
00491	2/11/97	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		5
00491	12/20/91	REAL	METHYLENE CHLORIDE	50 1	ug/L		0 01
00491	5/20/92	REAL	METHYLENE CHLORIDE	33	ug/L		0 01
00491	11/10/92	REAL	METHYLENE CHLORIDE	1	ug/L		0 2
00491	11/16/94	REAL	METHYLENE CHLORIDE	1	ug/L		0 2
00491	11/24/97	REAL	METHYLENE CHLORIDE	150	UG/L		5
00491	12/20/91	REAL	TETRACHLOROETHENE	24 7	ug/L		0 02
00491	2/28/92	REAL	TETRACHLOROETHENE	41	ug/L		0 02
00491	5/20/92	REAL	TETRACHLOROETHENE	54	ug/L		0 02
00491	5/20/92	REAL	TETRACHLOROETHENE	30	ug/L		0 02
00491	9/1/92	REAL	TETRACHLOROETHENE	48	ug/L		1 4
00491	11/10/92	REAL	TETRACHLOROETHENE	36	ug/L		0 2
00491	3/10/93	REAL	TETRACHLOROETHENE	34	ug/L		0 1
00491	5/11/93	REAL	TETRACHLOROETHENE	29	ug/L		0 1
00491	8/31/93	REAL	TETRACHLOROETHENE	40	ug/L		0 1
00491	12/8/93	REAL	TETRACHLOROETHENE	21	ug/L		0 1
00491	3/4/94	REAL	TETRACHLOROETHENE	23	ug/L		0 2
00491	5/19/94	REAL	TETRACHLOROETHENE	30	ug/L		0 2
00491	8/18/94	REAL	TETRACHLOROETHENE	46	ug/L		0 2
00491	11/16/94	REAL	TETRACHLOROETHENE	16	ug/L		0 2
00491	3/28/95	REAL	TETRACHLOROETHENE	15	ug/L		0 2
00491	9/12/96	REAL	TETRACHLOROETHENE	32	ug/L		5
00491	2/11/97	REAL	TETRACHLOROETHENE	21	ug/L		5

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37

Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	12/20/91	REAL	TOLUENE	0 22	ug/L		0 02
00491	5/20/92	REAL	trans-1,2-DICHLOROETHENE	0 2	ug/L		0 03
00491	9/1/92	REAL	trans-1,2-DICHLOROETHENE	0 1	ug/L		0 1
00491	12/20/91	REAL	TRICHLOROETHENE	68 5	ug/L		0 03
00491	12/20/91	REAL	TRICHLOROETHENE	68 5	ug/L		0 03
00491	2/28/92	REAL	TRICHLOROETHENE	110	ug/L		0 03
00491	2/28/92	REAL	TRICHLOROETHENE	110	ug/L		0 03
00491	5/20/92	REAL	TRICHLOROETHENE	140	ug/L		0 03
00491	5/20/92	REAL	TRICHLOROETHENE	140	ug/L		0 03
00491	5/20/92	REAL	TRICHLOROETHENE	114	ug/L		0 03
00491	5/20/92	REAL	TRICHLOROETHENE	114	ug/L		0 03
00491	9/1/92	REAL	TRICHLOROETHENE	140	ug/L		2 8
00491	9/1/92	REAL	TRICHLOROETHENE	140	ug/L		2 8
00491	3/10/93	REAL	TRICHLOROETHENE	87	ug/L		0 1
00491	3/10/93	REAL	TRICHLOROETHENE	87	ug/L		0 1
00491	5/11/93	REAL	TRICHLOROETHENE	110	ug/L		0 1
00491	5/11/93	REAL	TRICHLOROETHENE	110	ug/L		0 1
00491	8/31/93	REAL	TRICHLOROETHENE	120	ug/L		0 1
00491	8/31/93	REAL	TRICHLOROETHENE	120	ug/L		0 1
00491	12/8/93	REAL	TRICHLOROETHENE	66	ug/L		0 1
00491	12/8/93	REAL	TRICHLOROETHENE	66	ug/L		0 1
00491	3/4/94	REAL	TRICHLOROETHENE	68	ug/L		0 2
00491	3/4/94	REAL	TRICHLOROETHENE	68	ug/L		0 2
00491	5/19/94	REAL	TRICHLOROETHENE	98	ug/L		0 2
00491	5/19/94	REAL	TRICHLOROETHENE	98	ug/L		0 2
00491	8/18/94	REAL	TRICHLOROETHENE	140	ug/L		0 2
00491	8/18/94	REAL	TRICHLOROETHENE	140	ug/L		0 2
00491	11/16/94	REAL	TRICHLOROETHENE	56	ug/L		0 2
00491	11/16/94	REAL	TRICHLOROETHENE	56	ug/L		0 2
00491	3/28/95	REAL	TRICHLOROETHENE	52	ug/L		0 2
00491	3/28/95	REAL	TRICHLOROETHENE	52	ug/L		0 2

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Groundwater Results for Well 0491

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
00491	9/12/96	REAL	TRICHLOROETHENE	73	ug/L		5
00491	9/12/96	REAL	TRICHLOROETHENE	73	ug/L		5
00491	2/11/97	REAL	TRICHLOROETHENE	55	ug/L		5
00491	2/11/97	REAL	TRICHLOROETHENE	55	ug/L		5
00491	11/24/97	REAL	TRICHLOROETHENE	41 5	UG/L		5
00491	11/24/97	REAL	TRICHLOROETHENE	41 5	UG/L		5
00491	2/13/96	REAL	CARBON TETRACHLORIDE	170	ug/L		5
00491	2/13/96	REAL	CHLOROFORM	67	ug/L		5
00491	2/13/96	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		5
00491	2/13/96	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		5
00491	2/13/96	REAL	TETRACHLOROETHENE	25	ug/L		5
00491	2/13/96	REAL	TRICHLOROETHENE	64	ug/L		5
00491	2/13/96	REAL	TRICHLOROETHENE	64	ug/L		5

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35

Groundwater Results

For

Well 07391

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	3/16/92	REAL	1,1,1-TRICHLOROETHANE	87	ug/L	E	0 01
07391	3/16/92	REAL	1,1,1-TRICHLOROETHANE	540	ug/L		0 01
07391	5/21/92	REAL	1,1,1-TRICHLOROETHANE	120	ug/L	E	0 01
07391	8/28/92	REAL	1,1,1-TRICHLOROETHANE	1100	ug/L	E	0 19
07391	8/28/92	REAL	1,1,1-TRICHLOROETHANE	1000	ug/L	J	1900
07391	9/14/93	REAL	1,1,1-TRICHLOROETHANE	420	ug/L	E	5
07391	11/29/93	REAL	1,1,1-TRICHLOROETHANE	150	ug/L		10
07391	5/19/95	REAL	1,1,1-TRICHLOROETHANE	220	ug/L	J	0 5
07391	3/13/96	REAL	1,1,1-TRICHLOROETHANE	350	ug/L	J	2500
07391	3/16/92	REAL	1,1,2,2-TETRACHLOROETHANE	4 8	ug/L		0 01
07391	3/16/92	REAL	1,1,2,2-TETRACHLOROETHANE	180	ug/L		0 01
07391	5/21/92	REAL	1,1,2,2-TETRACHLOROETHANE	2 8	ug/L		0 01
07391	3/16/92	REAL	1,1,2-TRICHLOROETHANE	20	ug/L	E	0 04
07391	5/21/92	REAL	1,1,2-TRICHLOROETHANE	21	ug/L		0 04
07391	9/14/93	REAL	1,1,2-TRICHLOROETHANE	30	ug/L		5
07391	5/19/95	REAL	1,1,2-TRICHLOROTRIFLUOROET	390	ug/L	J	
07391	3/16/92	REAL	1,1-DICHLOROETHANE	110	ug/L	E	0 03
07391	3/16/92	REAL	1,1-DICHLOROETHANE	130	ug/L	J	0 03
07391	5/21/92	REAL	1,1-DICHLOROETHANE	160	ug/L	E	0 03
07391	5/21/92	REAL	1,1-DICHLOROETHANE	270	ug/L		0 03
07391	8/28/92	REAL	1,1-DICHLOROETHANE	660	ug/L	E	0 14
07391	9/14/93	REAL	1,1-DICHLOROETHANE	340	ug/L	E	5
07391	11/29/93	REAL	1,1-DICHLOROETHANE	330	ug/L	E	10
07391	3/16/92	REAL	1,1-DICHLOROETHENE	200	ug/L	EB	0 04
07391	3/16/92	REAL	1,1-DICHLOROETHENE	260	ug/L		0 04
07391	5/21/92	REAL	1,1-DICHLOROETHENE	190	ug/L		0 04
07391	5/21/92	REAL	1,1-DICHLOROETHENE	15	ug/L		0 04
07391	8/28/92	REAL	1,1-DICHLOROETHENE	380	ug/L	E	0 13
07391	9/14/93	REAL	1,1-DICHLOROETHENE	160	ug/L		5
07391	11/29/93	REAL	1,1-DICHLOROETHENE	170	ug/L		10
07391	3/16/92	REAL	1,2,3-TRICHLOROPROPANE	0 4	ug/L		0 02

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41

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	5/21/92	REAL	1,2,3-TRICHLOROPROPANE	0 11	ug/L		0 02
07391	5/21/92	REAL	1,2-DIBROMOETHANE	13	ug/L		0 17
07391	3/16/92	REAL	1,2-DICHLOROBENZENE	0 1	ug/L		0 03
07391	3/16/92	REAL	1,2-DICHLOROETHANE	7 3	ug/L		0 03
07391	3/16/92	REAL	1,2-DICHLOROETHANE	7 3	ug/L		0 03
07391	5/21/92	REAL	1,2-DICHLOROETHANE	6 2	ug/L		0 03
07391	5/21/92	REAL	1,2-DICHLOROETHANE	6 2	ug/L		0 03
07391	9/14/93	REAL	1,2-DICHLOROETHANE	33	ug/L		5
07391	9/14/93	REAL	1,2-DICHLOROETHANE	33	ug/L		5
07391	9/14/93	REAL	1,2-DICHLOROETHENE	420	ug/L	E	5
07391	11/29/93	REAL	1,2-DICHLOROETHENE	390	ug/L		10
07391	3/16/92	REAL	1,2-DICHLOROPROPANE	200	ug/L	E	0 03
07391	5/21/92	REAL	1,2-DICHLOROPROPANE	146	ug/L		0 03
07391	9/14/93	REAL	1,2-DICHLOROPROPANE	11	ug/L		5
07391	11/29/93	REAL	4-METHYL-2-PENTANONE	1500	ug/L	DJ	5000
07391	9/14/93	REAL	ACETONE	3600	ug/L	DJ	10000
07391	11/29/93	REAL	ACETONE	3400	ug/L	DJ	5000
07391	3/16/92	REAL	BENZENE	4 9	ug/L		0 01
07391	8/28/92	REAL	BENZENE	38	ug/L	E	0 17
07391	9/14/93	REAL	BENZENE	19	ug/L		5
07391	11/29/93	REAL	BENZENE	16	ug/L		10
07391	3/16/92	REAL	BROMOCHLOROMETHANE	710	ug/L		0 01
07391	9/14/93	REAL	BROMODICHLOROMETHANE	6	ug/L		5
07391	3/16/92	REAL	BROMOFORM	1 9	ug/L		0 09
07391	5/21/92	REAL	BROMOFORM	1 1	ug/L		0 09
07391	8/28/92	REAL	BROMOFORM	1	ug/L		0 2
07391	11/29/93	REAL	BROMOMETHANE	11	ug/L		10
07391	3/16/92	REAL	CARBON TETRACHLORIDE	2300	ug/L		0 02
07391	5/21/92	REAL	CHLOROETHANE	1 4	ug/L		0 13
07391	8/28/92	REAL	CHLOROETHANE	2	ug/L		0 1
07391	3/16/92	REAL	CHLOROFORM	160	ug/L	E	0 01

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42

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	3/16/92	REAL	CHLOROFORM	1500	ug/L		0 01
07391	5/21/92	REAL	CHLOROFORM	150	ug/L	E	0 01
07391	5/21/92	REAL	CHLOROFORM	1700	ug/L		0 01
07391	8/28/92	REAL	CHLOROFORM	1700	ug/L	E	0 15
07391	8/28/92	REAL	CHLOROFORM	4500	ug/L		1500
07391	11/16/92	REAL	CHLOROFORM	1500	ug/L		0 1
07391	3/15/93	REAL	CHLOROFORM	1900	ug/L	D	0 1
07391	3/15/93	REAL	CHLOROFORM	3100	ug/L		0 1
07391	5/21/93	REAL	CHLOROFORM	1500	ug/L	DJ	5
07391	5/21/93	REAL	CHLOROFORM	1500	ug/L		5
07391	9/14/93	REAL	CHLOROFORM	1700	ug/L	DJ	5000
07391	11/29/93	REAL	CHLOROFORM	1400	ug/L	DJ	5000
07391	11/29/93	REAL	CHLOROFORM	1300	ug/L	DJ	5000
07391	3/11/94	REAL	CHLOROFORM	1000	ug/L	J	5
07391	3/11/94	REAL	CHLOROFORM	520	ug/L	J	5
07391	3/11/94	REAL	CHLOROFORM	1100	ug/L	J	5
07391	5/27/94	REAL	CHLOROFORM	1400	ug/L	J	5
07391	5/27/94	REAL	CHLOROFORM	1400	ug/L	J	5
07391	5/27/94	REAL	CHLOROFORM	1300	ug/L	J	5
07391	7/26/94	REAL	CHLOROFORM	1200	ug/L	J	5
07391	12/6/94	REAL	CHLOROFORM	1200	ug/L		0 2
07391	3/15/95	REAL	CHLOROFORM	1100	ug/L		0 2
07391	5/19/95	REAL	CHLOROFORM	1000	ug/L		0 5
07391	12/6/95	REAL	CHLOROFORM	4800	ug/L	J	5000
07391	3/13/96	REAL	CHLOROFORM	1800	ug/L	J	2500
07391	9/24/96	REAL	CHLOROFORM	1600	ug/L	J	2500
07391	2/11/97	REAL	CHLOROFORM	1400	ug/L	J	2500
07391	3/16/92	REAL	CHLOROMETHANE	4 7	ug/L		0 1
07391	5/21/92	REAL	CHLOROMETHANE	0 96	ug/L		0 1
07391	11/29/93	REAL	CHLOROMETHANE	17	ug/L		10
07391	3/16/92	REAL	cis-1,2-DICHLOROETHENE	38	ug/L	E	0 03

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93

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	3/16/92	REAL	cis-1,2-DICHLOROETHENE	38	ug/L	E	0 03
07391	3/16/92	REAL	cis-1,2-DICHLOROETHENE	220	ug/L		0 03
07391	3/16/92	REAL	cis-1,2-DICHLOROETHENE	220	ug/L		0 03
07391	5/21/92	REAL	cis-1,2-DICHLOROETHENE	120	ug/L		0 03
07391	5/21/92	REAL	cis-1,2-DICHLOROETHENE	120	ug/L		0 03
07391	5/21/92	REAL	cis-1,2-DICHLOROETHENE	330	ug/L		0 03
07391	5/21/92	REAL	cis-1,2-DICHLOROETHENE	330	ug/L		0 03
07391	8/28/92	REAL	cis-1,2-DICHLOROETHENE	620	ug/L	E	0 16
07391	8/28/92	REAL	cis-1,2-DICHLOROETHENE	620	ug/L	E	0 16
07391	3/15/93	REAL	cis-1,2-DICHLOROETHENE	610	ug/L		0 2
07391	3/15/93	REAL	cis-1,2-DICHLOROETHENE	610	ug/L		0 2
07391	3/16/92	REAL	cis-1,3-DICHLOROPROPENE	1600	ug/L		0 06
07391	3/16/92	REAL	CYANIDE	27	ug/L		10
07391	5/21/92	REAL	CYANIDE	18 5	ug/L		10
07391	5/21/93	REAL	CYANIDE	8 5	ug/L		10
07391	7/26/94	REAL	CYANIDE	7 08	ug/L		5
07391	5/19/95	REAL	CYANIDE	12 8	ug/L		5
07391	3/16/92	REAL	DIBROMOMETHANE	1700	ug/L		0 1
07391	5/21/92	REAL	DIBROMOMETHANE	9	ug/L		0 1
07391	3/16/92	REAL	ETHYLBENZENE	0 4	ug/L		0 04
07391	12/6/95	REAL	HEXACHLOROBUTADIENE	520	ug/L	J	5000
07391	5/21/92	REAL	m+p XYLENE	0 3	ug/L	J	0 02
07391	3/16/92	REAL	METHYLENE CHLORIDE	16	ug/L	B	0 01
07391	3/16/92	REAL	METHYLENE CHLORIDE	1200	ug/L		0 01
07391	5/21/92	REAL	METHYLENE CHLORIDE	7 7	ug/L		0 01
07391	8/28/92	REAL	METHYLENE CHLORIDE	39	ug/L	E	0 62
07391	11/29/93	REAL	METHYLENE CHLORIDE	1300	ug/L	DJ	5000
07391	11/29/93	REAL	METHYLENE CHLORIDE	1300	ug/L	DJ	5000
07391	11/29/93	REAL	METHYLENE CHLORIDE	27	ug/L		10
07391	5/21/92	REAL	NAPHTHALENE	0 26	ug/L		0 02
07391	5/21/92	REAL	o-XYLENE	0 16	ug/L	J	0 02

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Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	3/16/92	REAL	STYRENE	0 1	ug/L		0 1
07391	3/16/92	REAL	TETRACHLOROETHENE	35	ug/L	E	0 02
07391	3/16/92	REAL	TETRACHLOROETHENE	2700	ug/L		0 02
07391	5/21/92	REAL	TETRACHLOROETHENE	120	ug/L	E	0 02
07391	5/21/92	REAL	TETRACHLOROETHENE	690	ug/L		0 02
07391	8/28/92	REAL	TETRACHLOROETHENE	970	ug/L	E	0 14
07391	8/28/92	REAL	TETRACHLOROETHENE	2400	ug/L		1400
07391	11/16/92	REAL	TETRACHLOROETHENE	970	ug/L	J	0 2
07391	3/15/93	REAL	TETRACHLOROETHENE	1100	ug/L	D	0 1
07391	3/15/93	REAL	TETRACHLOROETHENE	1900	ug/L		0 1
07391	5/21/93	REAL	TETRACHLOROETHENE	700	ug/L	DJ	5
07391	5/21/93	REAL	TETRACHLOROETHENE	710	ug/L	J	5
07391	9/14/93	REAL	TETRACHLOROETHENE	750	ug/L	E	5
07391	11/29/93	REAL	TETRACHLOROETHENE	540	ug/L	DJ	5000
07391	11/29/93	REAL	TETRACHLOROETHENE	610	ug/L	DJ	5000
07391	11/29/93	REAL	TETRACHLOROETHENE	690	ug/L	E	10
07391	5/27/94	REAL	TETRACHLOROETHENE	660	ug/L	J	5
07391	5/27/94	REAL	TETRACHLOROETHENE	600	ug/L	J	5
07391	5/27/94	REAL	TETRACHLOROETHENE	500	ug/L	J	5
07391	12/6/94	REAL	TETRACHLOROETHENE	600	ug/L		0 2
07391	3/15/95	REAL	TETRACHLOROETHENE	780	ug/L		0 2
07391	5/19/95	REAL	TETRACHLOROETHENE	610	ug/L		0 5
07391	12/6/95	REAL	TETRACHLOROETHENE	1800	ug/L	J	5000
07391	3/13/96	REAL	TETRACHLOROETHENE	1500	ug/L	J	2500
07391	9/24/96	REAL	TETRACHLOROETHENE	1400	ug/L	J	2500
07391	2/11/97	REAL	TETRACHLOROETHENE	1500	ug/L	J	2500
07391	3/16/92	REAL	TOLUENE	8 5	ug/L		0 02
07391	5/21/92	REAL	TOLUENE	12	ug/L		0 02
07391	9/14/93	REAL	TOLUENE	3	ug/L	J	5
07391	12/6/94	REAL	TOLUENE	410	ug/L	J	0 2
07391	3/16/92	REAL	trans-1,2-DICHLOROETHENE	0 8	ug/L		0 03

Analytical data is through 1998, Table reflects "hits" observed, non-detected contaminants are not listed

85

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	5/21/92	REAL	trans-1,2-DICHLOROETHENE	3 2	ug/L		0 03
07391	3/16/92	REAL	TRICHLOROETHENE	44000	ug/L	E	0 03
07391	3/16/92	REAL	TRICHLOROETHENE	44000	ug/L	E	0 03
07391	3/16/92	REAL	TRICHLOROETHENE	20	ug/L	E	0 03
07391	3/16/92	REAL	TRICHLOROETHENE	20	ug/L	E	0 03
07391	5/21/92	REAL	TRICHLOROETHENE	76	ug/L	E	0 03
07391	5/21/92	REAL	TRICHLOROETHENE	76	ug/L	E	0 03
07391	5/21/92	REAL	TRICHLOROETHENE	45000	ug/L	E	0 03
07391	5/21/92	REAL	TRICHLOROETHENE	45000	ug/L	E	0 03
07391	5/21/92	REAL	TRICHLOROETHENE	54000	ug/L		0 03
07391	5/21/92	REAL	TRICHLOROETHENE	54000	ug/L		0 03
07391	8/28/92	REAL	TRICHLOROETHENE	7200	ug/L	E	0 28
07391	8/28/92	REAL	TRICHLOROETHENE	7200	ug/L	E	0 28
07391	8/28/92	REAL	TRICHLOROETHENE	140000	ug/L		2800
07391	8/28/92	REAL	TRICHLOROETHENE	140000	ug/L		2800
07391	11/16/92	REAL	TRICHLOROETHENE	150000	ug/L		0 2
07391	11/16/92	REAL	TRICHLOROETHENE	150000	ug/L		0 2
07391	3/15/93	REAL	TRICHLOROETHENE	93000	ug/L	D	0 1
07391	3/15/93	REAL	TRICHLOROETHENE	93000	ug/L	D	0 1
07391	3/15/93	REAL	TRICHLOROETHENE	220000	ug/L	E	0 1
07391	3/15/93	REAL	TRICHLOROETHENE	220000	ug/L	E	0 1
07391	5/21/93	REAL	TRICHLOROETHENE	92000	ug/L	BD	5
07391	5/21/93	REAL	TRICHLOROETHENE	92000	ug/L	BD	5
07391	5/21/93	REAL	TRICHLOROETHENE	90000	ug/L	BE	5
07391	5/21/93	REAL	TRICHLOROETHENE	90000	ug/L	BE	5
07391	9/14/93	REAL	TRICHLOROETHENE	86000	ug/L	D	5000
07391	9/14/93	REAL	TRICHLOROETHENE	86000	ug/L	D	5000
07391	9/14/93	REAL	TRICHLOROETHENE	3800	ug/L	E	5
07391	9/14/93	REAL	TRICHLOROETHENE	3800	ug/L	E	5
07391	11/29/93	REAL	TRICHLOROETHENE	58000	ug/L	D	5000
07391	11/29/93	REAL	TRICHLOROETHENE	58000	ug/L	D	5000

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46

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	11/29/93	REAL	TRICHLOROETHENE	71000	ug/L	D	5000
07391	11/29/93	REAL	TRICHLOROETHENE	71000	ug/L	D	5000
07391	11/29/93	REAL	TRICHLOROETHENE	2500	ug/L	E	10
07391	11/29/93	REAL	TRICHLOROETHENE	2500	ug/L	E	10
07391	3/11/94	REAL	TRICHLOROETHENE	52000	ug/L	B	5
07391	3/11/94	REAL	TRICHLOROETHENE	52000	ug/L	B	5
07391	5/27/94	REAL	TRICHLOROETHENE	64000	ug/L		5
07391	5/27/94	REAL	TRICHLOROETHENE	64000	ug/L		5
07391	7/26/94	REAL	TRICHLOROETHENE	61000	ug/L		5
07391	7/26/94	REAL	TRICHLOROETHENE	61000	ug/L		5
07391	12/6/94	REAL	TRICHLOROETHENE	65000	ug/L		0 2
07391	12/6/94	REAL	TRICHLOROETHENE	65000	ug/L		0 2
07391	3/15/95	REAL	TRICHLOROETHENE	67000	ug/L		0 2
07391	3/15/95	REAL	TRICHLOROETHENE	67000	ug/L		0 2
07391	5/19/95	REAL	TRICHLOROETHENE	55000	ug/L	D	0 5
07391	5/19/95	REAL	TRICHLOROETHENE	55000	ug/L	D	0 5
07391	5/19/95	REAL	TRICHLOROETHENE	44000	ug/L		0 5
07391	5/19/95	REAL	TRICHLOROETHENE	44000	ug/L		0 5
07391	12/6/95	REAL	TRICHLOROETHENE	160000	ug/L	B	5000
07391	12/6/95	REAL	TRICHLOROETHENE	160000	ug/L	B	5000
07391	3/13/96	REAL	TRICHLOROETHENE	99000	ug/L		2500
07391	3/13/96	REAL	TRICHLOROETHENE	99000	ug/L		2500
07391	9/24/96	REAL	TRICHLOROETHENE	100000	ug/L		2500
07391	9/24/96	REAL	TRICHLOROETHENE	100000	ug/L		2500
07391	2/11/97	REAL	TRICHLOROETHENE	96000	ug/L		2500
07391	2/11/97	REAL	TRICHLOROETHENE	96000	ug/L		2500
07391	3/17/98	REAL	TRICHLOROETHENE	27000	UG/L		1000
07391	3/17/98	REAL	TRICHLOROETHENE	27000	UG/L		1000
07391	3/16/92	REAL	TRICHLOROFLUOROMETHANE	0 45	ug/L	J	0 34
07391	5/21/92	REAL	TRICHLOROFLUOROMETHANE	0 53	ug/L		0 34
07391	3/16/92	REAL	VINYL CHLORIDE	2 7	ug/L		0 01

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97

Groundwater Results for Well 07391

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
07391	5/21/92	REAL	VINYL CHLORIDE	3 1	ug/L		0 01
07391	8/28/92	REAL	VINYL CHLORIDE	2	ug/L		0 2

Analytical data is through 1998, Table reflects "hits" observed, non-detected contaminants are not listed

Groundwater Results

For

Well 01291

Groundwater Results for Well 01291

01291	9/2/92	REAL	CHLOROFORM	29	ug/L	E	0 15
01291	5/21/92	REAL	METHYLENE CHLORIDE	23	ug/L	E	0 01
01291	9/2/92	REAL	CARBON DISULFIDE	50	ug/L	J	
01291	2/19/96	REAL	cis-1,2-DICHLOROETHENE	0 2	ug/L	J	1
01291	2/19/96	REAL	cis-1,2-DICHLOROETHENE	0 2	ug/L	J	1
01291	9/9/96	REAL	METHYLENE CHLORIDE	0 5	ug/L	J	1
01291	5/21/92	REAL	1,1,1-TRICHLOROETHANE	0 18	ug/L		0 01
01291	9/2/92	REAL	1,1,1-TRICHLOROETHANE	0 2	ug/L		0 2
01291	5/21/92	REAL	BROMODICHLOROMETHANE	2 6	ug/L		0 1
01291	5/21/92	REAL	CARBON TETRACHLORIDE	9	ug/L		0 02
01291	9/2/92	REAL	CARBON TETRACHLORIDE	10	ug/L		0 1
01291	2/19/96	REAL	CARBON TETRACHLORIDE	15	ug/L		1
01291	9/9/96	REAL	CARBON TETRACHLORIDE	7	ug/L		1
01291	5/21/92	REAL	CHLOROFORM	21	ug/L		0 01
01291	9/2/92	REAL	CHLOROFORM	23	ug/L		0 75
01291	2/19/96	REAL	CHLOROFORM	24	ug/L		1
01291	9/9/96	REAL	CHLOROFORM	21	ug/L		1
01291	5/21/92	REAL	TETRACHLOROETHENE	1 2	ug/L		0 02
01291	9/2/92	REAL	TETRACHLOROETHENE	1	ug/L		0 1
01291	2/19/96	REAL	TETRACHLOROETHENE	2	ug/L		1
01291	9/9/96	REAL	TETRACHLOROETHENE	1	ug/L		1
01291	5/21/92	REAL	TRICHLOROETHENE	5 6	ug/L		0 03
01291	5/21/92	REAL	TRICHLOROETHENE	5 6	ug/L		0 03
01291	9/2/92	REAL	TRICHLOROETHENE	7	ug/L		0 3
01291	9/2/92	REAL	TRICHLOROETHENE	7	ug/L		0 3
01291	2/19/96	REAL	TRICHLOROETHENE	12	ug/L		1
01291	2/19/96	REAL	TRICHLOROETHENE	12	ug/L		1
01291	9/9/96	REAL	TRICHLOROETHENE	8	ug/L		1
01291	9/9/96	REAL	TRICHLOROETHENE	8	ug/L		1

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Groundwater Results

For

Well 1187

Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	6/15/90	REAL	1,1,1-TRICHLOROETHANE	4	ug/L	J	5
1187	9/19/90	REAL	1,1,1-TRICHLOROETHANE	5	ug/L		
1287	11/28/90	REAL	1,1,1-TRICHLOROETHANE	1	ug/L	J	5
1187	1/15/91	REAL	1,1,1-TRICHLOROETHANE	5	ug/L		5
1187	11/21/91	REAL	1,1,1-TRICHLOROETHANE	5	ug/L		5
1187	5/19/92	REAL	1,1,1-TRICHLOROETHANE	5	ug/L		5
1187	9/1/92	REAL	1,1,1-TRICHLOROETHANE	5	ug/L		5
1187	6/21/93	REAL	1,1,1-TRICHLOROETHANE	4	ug/L	J	5
1187	8/31/93	REAL	1,1,1-TRICHLOROETHANE	4	ug/L	J	5
1187	12/8/93	REAL	1,1,1-TRICHLOROETHANE	4	ug/L	J	10
1187	4/17/91	REAL	1,1,2-TRICHLOROTRIFLUOROETHANE	15	ug/L	J	
1187	6/15/90	REAL	1,1-DICHLOROETHENE	4	ug/L	J	5
1187	9/19/90	REAL	1,1-DICHLOROETHENE	8	ug/L		
1187	1/15/91	REAL	1,1-DICHLOROETHENE	12	ug/L		5
1187	4/17/91	REAL	1,1-DICHLOROETHENE	12	ug/L		5
1187	11/21/91	REAL	1,1-DICHLOROETHENE	6	ug/L		5
1187	5/19/92	REAL	1,1-DICHLOROETHENE	5	ug/L		5
1187	9/1/92	REAL	1,1-DICHLOROETHENE	7	ug/L		5
1187	3/12/93	REAL	1,1-DICHLOROETHENE	3	ug/L	J	5
1187	6/21/93	REAL	1,1-DICHLOROETHENE	5	ug/L		5
1187	8/31/93	REAL	1,1-DICHLOROETHENE	6	ug/L		5
1187	12/8/93	REAL	1,1-DICHLOROETHENE	7	ug/L	J	10
1187	9/1/92	REAL	1,2-DICHLOROETHANE	0 5	ug/L	J	5
1187	9/1/92	REAL	1,2-DICHLOROETHANE	0 5	ug/L	J	5
1187	6/15/90	REAL	1,2-DICHLOROETHENE	8	ug/L		5
1187	9/19/90	REAL	1,2-DICHLOROETHENE	10	ug/L		
1187	1/15/91	REAL	1,2-DICHLOROETHENE	18	ug/L		5
1187	11/21/91	REAL	1,2-DICHLOROETHENE	13	ug/L		5
1187	5/19/92	REAL	1,2-DICHLOROETHENE	11	ug/L		5
1187	9/1/92	REAL	1,2-DICHLOROETHENE	11	ug/L		5
1187	3/12/93	REAL	1,2-DICHLOROETHENE	8	ug/L		5
1187	8/31/93	REAL	1,2-DICHLOROETHENE	11	ug/L		5

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52

Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	12/8/93	REAL	1,2-DICHLOROETHENE	11	ug/L		10
1187	9/19/90	REAL	2-BUTANONE	75	ug/L	BDJ	
1187	11/27/90	REAL	2-BUTANONE	150	ug/L	B	10
1187	12/4/89	REAL	ACETONE	170	ug/L	B	50
1187	9/19/90	REAL	ACETONE	49	ug/L	BDJ	
1187	9/19/90	REAL	ACETONE	5	ug/L	J	
1187	11/21/91	REAL	ACETONE	74	ug/L	BDJ	10
1187	9/1/92	REAL	ACETONE	7	ug/L	JB	10
1187	9/1/92	REAL	BROMODICHLOROMETHANE	20	ug/L	J	250
1187	9/1/92	REAL	BROMODICHLOROMETHANE	0 6	ug/L	J	5
1187	9/1/92	REAL	BROMOMETHANE	110	ug/L	J	500
1187	9/16/87	REAL	CARBON TETRACHLORIDE	430	ug/L	J	
1187	12/4/89	REAL	CARBON TETRACHLORIDE	90	ug/L		25
1187	6/15/90	REAL	CARBON TETRACHLORIDE	670	ug/L	E	5
1187	9/19/90	REAL	CARBON TETRACHLORIDE	1000	ug/L	D	
1187	9/19/90	REAL	CARBON TETRACHLORIDE	810	ug/L	E	
1187	11/27/90	REAL	CARBON TETRACHLORIDE	660	ug/L		5
1187	1/15/91	REAL	CARBON TETRACHLORIDE	750	ug/L	D	5
1187	1/15/91	REAL	CARBON TETRACHLORIDE	520	ug/L	D	5
1187	1/15/91	REAL	CARBON TETRACHLORIDE	980	ug/L	E	5
1187	4/17/91	REAL	CARBON TETRACHLORIDE	400	ug/L	D	5
1187	4/17/91	REAL	CARBON TETRACHLORIDE	530	ug/L	E	5
1187	9/6/91	REAL	CARBON TETRACHLORIDE	610	ug/L		5
1187	11/21/91	REAL	CARBON TETRACHLORIDE	520	ug/L	D	5
1187	11/21/91	REAL	CARBON TETRACHLORIDE	520	ug/L	D	5
1187	11/21/91	REAL	CARBON TETRACHLORIDE	910	ug/L	E	5
1187	2/22/92	REAL	CARBON TETRACHLORIDE	680	ug/L		5
1187	5/19/92	REAL	CARBON TETRACHLORIDE	400	ug/L	D	5
1187	5/19/92	REAL	CARBON TETRACHLORIDE	710	ug/L	E	5
1187	9/1/92	REAL	CARBON TETRACHLORIDE	580	ug/L		250
1187	9/1/92	REAL	CARBON TETRACHLORIDE	540	ug/L		5
1187	11/20/92	REAL	CARBON TETRACHLORIDE	650	ug/L		5

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53

Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	3/12/93	REAL	CARBON TETRACHLORIDE	380	ug/L	D	5
1187	3/12/93	REAL	CARBON TETRACHLORIDE	600	ug/L	E	5
1187	6/21/93	REAL	CARBON TETRACHLORIDE	450	ug/L	D	100
1187	6/21/93	REAL	CARBON TETRACHLORIDE	410	ug/L	E	5
1187	8/31/93	REAL	CARBON TETRACHLORIDE	500	ug/L	E	5
1187	8/31/93	REAL	CARBON TETRACHLORIDE	280	ug/L		100
1187	12/8/93	REAL	CARBON TETRACHLORIDE	450	ug/L	E	10
1187	5/20/94	REAL	CARBON TETRACHLORIDE	330	ug/L	D	0 3
1187	5/20/94	REAL	CARBON TETRACHLORIDE	420	ug/L		0 3
1187	7/26/94	REAL	CARBON TETRACHLORIDE	530	ug/L		5
1187	11/16/94	REAL	CARBON TETRACHLORIDE	440	ug/L		0 3
1187	6/14/95	REAL	CARBON TETRACHLORIDE	300	ug/L		0 5
1187	9/10/96	REAL	CARBON TETRACHLORIDE	370	ug/L		120
1187	12/4/89	REAL	CHLOROFORM	28	ug/L		25
1187	6/15/90	REAL	CHLOROFORM	79	ug/L		5
1187	9/19/90	REAL	CHLOROFORM	120	ug/L	D	
1187	9/19/90	REAL	CHLOROFORM	92	ug/L		
1187	11/27/90	REAL	CHLOROFORM	86	ug/L		5
1187	1/15/91	REAL	CHLOROFORM	100	ug/L	DJ	5
1187	1/15/91	REAL	CHLOROFORM	89	ug/L	DJ	5
1187	1/15/91	REAL	CHLOROFORM	96	ug/L		5
1187	4/17/91	REAL	CHLOROFORM	62	ug/L	D	5
1187	4/17/91	REAL	CHLOROFORM	82	ug/L		5
1187	9/6/91	REAL	CHLOROFORM	92	ug/L	J	5
1187	11/21/91	REAL	CHLOROFORM	95	ug/L	DJ	5
1187	11/21/91	REAL	CHLOROFORM	100	ug/L		5
1187	2/22/92	REAL	CHLOROFORM	110	ug/L	B	5
1187	5/19/92	REAL	CHLOROFORM	76	ug/L	B	5
1187	5/19/92	REAL	CHLOROFORM	90	ug/L	BDJ	5
1187	9/1/92	REAL	CHLOROFORM	94	ug/L	J	250
1187	9/1/92	REAL	CHLOROFORM	87	ug/L		5
1187	11/20/92	REAL	CHLOROFORM	92	ug/L	J	5

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Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	3/12/93	REAL	CHLOROFORM	62	ug/L	DJ	5
1187	3/12/93	REAL	CHLOROFORM	79	ug/L		5
1187	6/21/93	REAL	CHLOROFORM	87	ug/L	DJ	100
1187	6/21/93	REAL	CHLOROFORM	83	ug/L		5
1187	8/31/93	REAL	CHLOROFORM	79	ug/L	J	100
1187	8/31/93	REAL	CHLOROFORM	81	ug/L		5
1187	12/8/93	REAL	CHLOROFORM	96	ug/L		10
1187	5/20/94	REAL	CHLOROFORM	85	ug/L	D	0 2
1187	5/20/94	REAL	CHLOROFORM	87	ug/L		0 2
1187	7/26/94	REAL	CHLOROFORM	92	ug/L	J	5
1187	11/16/94	REAL	CHLOROFORM	100	ug/L		0 2
1187	6/14/95	REAL	CHLOROFORM	72	ug/L	J	0 5
1187	9/10/96	REAL	CHLOROFORM	83	ug/L	J	120
1187	5/20/94	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		0 2
1187	5/20/94	REAL	cis-1,2-DICHLOROETHENE	9	ug/L		0 2
1187	12/4/89	REAL	METHYLENE CHLORIDE	42	ug/L	B	25
1187	9/19/90	REAL	METHYLENE CHLORIDE	9	ug/L	B	
1187	9/19/90	REAL	METHYLENE CHLORIDE	130	ug/L	BD	
1187	1/15/91	REAL	METHYLENE CHLORIDE	1	ug/L	J	5
1187	11/21/91	REAL	METHYLENE CHLORIDE	130	ug/L	BD	5
1187	11/16/94	REAL	METHYLENE CHLORIDE	40	ug/L		0 2
1187	6/14/95	REAL	METHYLENE CHLORIDE	93	ug/L	BJ	1
1187	9/10/96	REAL	METHYLENE CHLORIDE	65	ug/L	J	120
1187	12/4/89	REAL	TETRACHLOROETHENE	8	ug/L	J	25
1187	6/15/90	REAL	TETRACHLOROETHENE	32	ug/L		5
1187	9/19/90	REAL	TETRACHLOROETHENE	46	ug/L	B	
1187	9/19/90	REAL	TETRACHLOROETHENE	56	ug/L	DJ	
1187	11/27/90	REAL	TETRACHLOROETHENE	41	ug/L	J	5
1187	1/15/91	REAL	TETRACHLOROETHENE	62	ug/L		5
1187	4/17/91	REAL	TETRACHLOROETHENE	27	ug/L	DJ	5
1187	4/17/91	REAL	TETRACHLOROETHENE	49	ug/L		5
1187	9/6/91	REAL	TETRACHLOROETHENE	45	ug/L	J	5

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Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	11/21/91	REAL	TETRACHLOROETHENE	36	ug/L	DJ	5
1187	11/21/91	REAL	TETRACHLOROETHENE	48	ug/L		5
1187	2/22/92	REAL	TETRACHLOROETHENE	59	ug/L	J	5
1187	5/19/92	REAL	TETRACHLOROETHENE	29	ug/L	DJ	5
1187	5/19/92	REAL	TETRACHLOROETHENE	39	ug/L		5
1187	9/1/92	REAL	TETRACHLOROETHENE	55	ug/L	J	250
1187	9/1/92	REAL	TETRACHLOROETHENE	47	ug/L		5
1187	11/20/92	REAL	TETRACHLOROETHENE	44	ug/L	J	5
1187	3/12/93	REAL	TETRACHLOROETHENE	38	ug/L		5
1187	6/21/93	REAL	TETRACHLOROETHENE	43	ug/L		5
1187	8/31/93	REAL	TETRACHLOROETHENE	42	ug/L		5
1187	12/8/93	REAL	TETRACHLOROETHENE	49	ug/L		10
1187	5/20/94	REAL	TETRACHLOROETHENE	31	ug/L	D	0 2
1187	5/20/94	REAL	TETRACHLOROETHENE	44	ug/L		0 2
1187	7/26/94	REAL	TETRACHLOROETHENE	50	ug/L	J	5
1187	11/16/94	REAL	TETRACHLOROETHENE	44	ug/L		0 2
1187	9/10/96	REAL	TETRACHLOROETHENE	59	ug/L	J	120
1187	9/19/90	REAL	TOLUENE	1	ug/L	J	
1187	9/16/87	REAL	TRICHLOROETHENE	590	ug/L		
1187	9/16/87	REAL	TRICHLOROETHENE	590	ug/L		
1187	12/4/89	REAL	TRICHLOROETHENE	430	ug/L		25
1187	12/4/89	REAL	TRICHLOROETHENE	430	ug/L		25
1187	6/15/90	REAL	TRICHLOROETHENE	1800	ug/L	E	5
1187	6/15/90	REAL	TRICHLOROETHENE	1800	ug/L	E	5
1187	9/19/90	REAL	TRICHLOROETHENE	2900	ug/L	D	
1187	9/19/90	REAL	TRICHLOROETHENE	2900	ug/L	D	
1187	9/19/90	REAL	TRICHLOROETHENE	1000	ug/L	E	
1187	9/19/90	REAL	TRICHLOROETHENE	1000	ug/L	E	
1187	11/27/90	REAL	TRICHLOROETHENE	1900	ug/L		5
1187	11/27/90	REAL	TRICHLOROETHENE	1900	ug/L		5
1187	1/15/91	REAL	TRICHLOROETHENE	2500	ug/L	D	5
1187	1/15/91	REAL	TRICHLOROETHENE	2500	ug/L	D	5

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Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	1/15/91	REAL	TRICHLOROETHENE	1900	ug/L	D	5
1187	1/15/91	REAL	TRICHLOROETHENE	1900	ug/L	D	5
1187	1/15/91	REAL	TRICHLOROETHENE	2900	ug/L	E	5
1187	1/15/91	REAL	TRICHLOROETHENE	2900	ug/L	E	5
1187	4/17/91	REAL	TRICHLOROETHENE	1400	ug/L	D	5
1187	4/17/91	REAL	TRICHLOROETHENE	1400	ug/L	D	5
1187	4/17/91	REAL	TRICHLOROETHENE	1200	ug/L	E	5
1187	4/17/91	REAL	TRICHLOROETHENE	1200	ug/L	E	5
1187	9/6/91	REAL	TRICHLOROETHENE	3300	ug/L		5
1187	9/6/91	REAL	TRICHLOROETHENE	3300	ug/L		5
1187	11/21/91	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	11/21/91	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	11/21/91	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	11/21/91	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	11/21/91	REAL	TRICHLOROETHENE	2100	ug/L	E	5
1187	11/21/91	REAL	TRICHLOROETHENE	2100	ug/L	E	5
1187	2/22/92	REAL	TRICHLOROETHENE	3300	ug/L		5
1187	2/22/92	REAL	TRICHLOROETHENE	3300	ug/L		5
1187	5/19/92	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	5/19/92	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	5/19/92	REAL	TRICHLOROETHENE	3500	ug/L	E	5
1187	5/19/92	REAL	TRICHLOROETHENE	3500	ug/L	E	5
1187	9/1/92	REAL	TRICHLOROETHENE	3100	ug/L		250
1187	9/1/92	REAL	TRICHLOROETHENE	3100	ug/L		250
1187	9/1/92	REAL	TRICHLOROETHENE	930	ug/L		5
1187	9/1/92	REAL	TRICHLOROETHENE	930	ug/L		5
1187	11/20/92	REAL	TRICHLOROETHENE	3000	ug/L		5
1187	11/20/92	REAL	TRICHLOROETHENE	3000	ug/L		5
1187	3/12/93	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	3/12/93	REAL	TRICHLOROETHENE	2400	ug/L	D	5
1187	3/12/93	REAL	TRICHLOROETHENE	2900	ug/L	E	5
1187	3/12/93	REAL	TRICHLOROETHENE	2900	ug/L	E	5

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57

Groundwater Results for Well 1187

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1187	6/21/93	REAL	TRICHLOROETHENE	2800	ug/L	D	100
1187	6/21/93	REAL	TRICHLOROETHENE	2800	ug/L	D	100
1187	6/21/93	REAL	TRICHLOROETHENE	780	ug/L	E	5
1187	6/21/93	REAL	TRICHLOROETHENE	780	ug/L	E	5
1187	8/31/93	REAL	TRICHLOROETHENE	1800	ug/L	E	5
1187	8/31/93	REAL	TRICHLOROETHENE	1800	ug/L	E	5
1187	8/31/93	REAL	TRICHLOROETHENE	2400	ug/L		100
1187	8/31/93	REAL	TRICHLOROETHENE	2400	ug/L		100
1187	12/8/93	REAL	TRICHLOROETHENE	1700	ug/L	D	500
1187	12/8/93	REAL	TRICHLOROETHENE	1700	ug/L	D	500
1187	12/8/93	REAL	TRICHLOROETHENE	920	ug/L	E	10
1187	12/8/93	REAL	TRICHLOROETHENE	920	ug/L	E	10
1187	5/20/94	REAL	TRICHLOROETHENE	2900	ug/L	D	0 2
1187	5/20/94	REAL	TRICHLOROETHENE	2900	ug/L	D	0 2
1187	5/20/94	REAL	TRICHLOROETHENE	4000	ug/L	E	0 2
1187	5/20/94	REAL	TRICHLOROETHENE	4000	ug/L	E	0 2
1187	7/26/94	REAL	TRICHLOROETHENE	3800	ug/L		5
1187	7/26/94	REAL	TRICHLOROETHENE	3800	ug/L		5
1187	11/16/94	REAL	TRICHLOROETHENE	4100	ug/L		0 2
1187	11/16/94	REAL	TRICHLOROETHENE	4100	ug/L		0 2
1187	6/14/95	REAL	TRICHLOROETHENE	3200	ug/L		0 5
1187	6/14/95	REAL	TRICHLOROETHENE	3200	ug/L		0 5
1187	9/10/96	REAL	TRICHLOROETHENE	4400	ug/L		120
1187	9/10/96	REAL	TRICHLOROETHENE	4400	ug/L		120

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38

Groundwater Results

For

Well 1487

Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	1/11/91	REAL	1,1,1-TRICHLOROETHANE	1	ug/L	J	5
1487	2/21/92	REAL	1,1,1-TRICHLOROETHANE	1 06	ug/L		0 01
1487	8/31/92	REAL	1,1,1-TRICHLOROETHANE	1	ug/L	J	5
1487	5/17/94	REAL	1,1,1-TRICHLOROETHANE	1	ug/L	J	5
1487	1/11/91	REAL	1,1-DICHLOROETHENE	3	ug/L	J	5
1487	4/15/91	REAL	1,1-DICHLOROETHENE	1	ug/L	J	5
1487	2/21/92	REAL	1,1-DICHLOROETHENE	1 83	ug/L		0 04
1487	8/31/92	REAL	1,1-DICHLOROETHENE	3	ug/L	J	5
1487	5/17/94	REAL	1,1-DICHLOROETHENE	3	ug/L	DJ	5
1487	5/17/94	REAL	1,1-DICHLOROETHENE	2	ug/L	J	5
1487	11/16/94	REAL	1,1-DICHLOROETHENE	3	ug/L	J	5
1487	6/16/95	REAL	1,1-DICHLOROETHENE	5	ug/L	J	10
1487	1/11/91	REAL	1,2-DICHLOROETHENE	2	ug/L	J	5
1487	4/15/91	REAL	1,2-DICHLOROETHENE	1	ug/L	J	5
1487	5/20/92	REAL	1,2-DICHLOROETHENE	2	ug/L	J	5
1487	8/31/92	REAL	1,2-DICHLOROETHENE	3	ug/L	J	5
1487	3/11/93	REAL	1,2-DICHLOROETHENE	2	ug/L	J	5
1487	8/31/93	REAL	1,2-DICHLOROETHENE	5	ug/L		5
1487	12/8/93	REAL	1,2-DICHLOROETHENE	3	ug/L	J	5
1487	5/17/94	REAL	1,2-DICHLOROETHENE	5	ug/L	DJ	5
1487	5/17/94	REAL	1,2-DICHLOROETHENE	4	ug/L	J	5
1487	8/10/94	REAL	1,2-DICHLOROETHENE	4	ug/L	J	5
1487	8/10/94	REAL	1,2-DICHLOROETHENE	4	ug/L	J	5
1487	8/10/94	REAL	1,2-DICHLOROETHENE	4	ug/L	J	5
1487	11/16/94	REAL	1,2-DICHLOROETHENE	5	ug/L	DJ	5
1487	11/16/94	REAL	1,2-DICHLOROETHENE	5	ug/L		5
1487	6/16/95	REAL	1,2-DICHLOROETHENE	4	ug/L	J	10
1487	1/11/91	REAL	2-BUTANONE	43	ug/L	BDJ	10
1487	1/11/91	REAL	ACETONE	14	ug/L	B	10
1487	1/11/91	REAL	ACETONE	32	ug/L	BDJ	10
1487	9/5/91	REAL	ACETONE	26	ug/L		10

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60

Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	8/31/92	REAL	ACETONE	65	ug/L	JB	100
1487	8/31/92	REAL	BROMODICHLOROMETHANE	1	ug/L	J	5
1487	8/31/92	REAL	BROMOMETHANE	1	ug/L	J	10
1487	11/28/89	DUP	CARBON TETRACHLORIDE	450	ug/L	E	5
1487	11/28/89	REAL	CARBON TETRACHLORIDE	410	ug/L	E	5
1487	6/14/90	REAL	CARBON TETRACHLORIDE	380	ug/L		
1487	9/18/90	REAL	CARBON TETRACHLORIDE	130	ug/L		5
1487	1/11/91	REAL	CARBON TETRACHLORIDE	430	ug/L	D	5
1487	1/11/91	REAL	CARBON TETRACHLORIDE	670	ug/L	E	5
1487	4/15/91	REAL	CARBON TETRACHLORIDE	300	ug/L	D	5
1487	4/15/91	REAL	CARBON TETRACHLORIDE	330	ug/L	E	5
1487	9/5/91	REAL	CARBON TETRACHLORIDE	350	ug/L		5
1487	11/20/91	REAL	CARBON TETRACHLORIDE	440	ug/L		5
1487	2/21/92	REAL	CARBON TETRACHLORIDE	55 2	ug/L	E	0 02
1487	2/21/92	REAL	CARBON TETRACHLORIDE	270	ug/L		0 02
1487	5/20/92	REAL	CARBON TETRACHLORIDE	330	ug/L	D	5
1487	5/20/92	REAL	CARBON TETRACHLORIDE	390	ug/L	E	5
1487	8/31/92	REAL	CARBON TETRACHLORIDE	560	ug/L	E	5
1487	8/31/92	REAL	CARBON TETRACHLORIDE	570	ug/L		50
1487	11/11/92	REAL	CARBON TETRACHLORIDE	17	ug/L		5
1487	3/11/93	REAL	CARBON TETRACHLORIDE	500	ug/L	D	5
1487	3/11/93	REAL	CARBON TETRACHLORIDE	700	ug/L	E	5
1487	5/11/93	REAL	CARBON TETRACHLORIDE	320	ug/L	D	10
1487	5/11/93	REAL	CARBON TETRACHLORIDE	310	ug/L	E	5
1487	8/31/93	REAL	CARBON TETRACHLORIDE	760	ug/L	E	5
1487	8/31/93	REAL	CARBON TETRACHLORIDE	540	ug/L		50
1487	12/8/93	REAL	CARBON TETRACHLORIDE	320	ug/L		5
1487	5/17/94	REAL	CARBON TETRACHLORIDE	510	ug/L	D	5
1487	5/17/94	REAL	CARBON TETRACHLORIDE	530	ug/L	E	5
1487	8/10/94	REAL	CARBON TETRACHLORIDE	560	ug/L		5
1487	8/10/94	REAL	CARBON TETRACHLORIDE	510	ug/L		5

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Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	8/10/94	REAL	CARBON TETRACHLORIDE	520	ug/L		5
1487	11/16/94	REAL	CARBON TETRACHLORIDE	680	ug/L	D	5
1487	11/16/94	REAL	CARBON TETRACHLORIDE	510	ug/L	E	5
1487	6/16/95	REAL	CARBON TETRACHLORIDE	760	ug/L	D	10
1487	6/16/95	REAL	CARBON TETRACHLORIDE	770	ug/L	E	10
1487	7/30/96	REAL	CARBON TETRACHLORIDE	460	ug/L		12
1487	11/28/89	DUP	CHLOROFORM	33	ug/L		5
1487	11/28/89	REAL	CHLOROFORM	28	ug/L	J	5
1487	6/14/90	REAL	CHLOROFORM	38	ug/L		
1487	9/18/90	REAL	CHLOROFORM	20	ug/L		5
1487	1/11/91	REAL	CHLOROFORM	31	ug/L	D	5
1487	1/11/91	REAL	CHLOROFORM	36	ug/L		5
1487	4/15/91	REAL	CHLOROFORM	24	ug/L	D	5
1487	4/15/91	REAL	CHLOROFORM	27	ug/L		5
1487	9/5/91	REAL	CHLOROFORM	31	ug/L		5
1487	11/20/91	REAL	CHLOROFORM	41	ug/L		5
1487	2/21/92	REAL	CHLOROFORM	23	ug/L		0 01
1487	2/21/92	REAL	CHLOROFORM	32 4	ug/L		0 01
1487	5/20/92	REAL	CHLOROFORM	30	ug/L	BD	5
1487	8/31/92	REAL	CHLOROFORM	39	ug/L	J	50
1487	8/31/92	REAL	CHLOROFORM	40	ug/L		5
1487	3/11/93	REAL	CHLOROFORM	31	ug/L	D	5
1487	3/11/93	REAL	CHLOROFORM	39	ug/L		5
1487	5/11/93	REAL	CHLOROFORM	31	ug/L	D	10
1487	5/11/93	REAL	CHLOROFORM	35	ug/L		5
1487	8/31/93	REAL	CHLOROFORM	46	ug/L	J	50
1487	8/31/93	REAL	CHLOROFORM	47	ug/L		5
1487	12/8/93	REAL	CHLOROFORM	26	ug/L		5
1487	5/17/94	REAL	CHLOROFORM	35	ug/L	D	5
1487	5/17/94	REAL	CHLOROFORM	38	ug/L		5
1487	8/10/94	REAL	CHLOROFORM	41	ug/L		5

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62

Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	8/10/94	REAL	CHLOROFORM	39	ug/L		5
1487	8/10/94	REAL	CHLOROFORM	42	ug/L		5
1487	11/16/94	REAL	CHLOROFORM	50	ug/L	D	5
1487	11/16/94	REAL	CHLOROFORM	46	ug/L		5
1487	6/16/95	REAL	CHLOROFORM	55	ug/L	DJ	10
1487	6/16/95	REAL	CHLOROFORM	48	ug/L		10
1487	7/30/96	REAL	CHLOROFORM	36	ug/L		12
1487	2/21/92	REAL	cis-1,2-DICHLOROETHENE	2 34	ug/L		0 03
1487	2/21/92	REAL	cis-1,2-DICHLOROETHENE	2 34	ug/L		0 03
1487	6/14/90	REAL	METHYLENE CHLORIDE	5	ug/L	B	
1487	1/11/91	REAL	METHYLENE CHLORIDE	13	ug/L	DJ	5
1487	5/20/92	REAL	METHYLENE CHLORIDE	3	ug/L	BDJ	5
1487	8/31/92	REAL	METHYLENE CHLORIDE	17	ug/L	J	50
1487	8/10/94	REAL	METHYLENE CHLORIDE	3	ug/L	J	5
1487	6/16/95	REAL	METHYLENE CHLORIDE	19	ug/L	BJ	10
1487	11/28/89	DUP	TETRACHLOROETHENE	4	ug/L	J	5
1487	11/28/89	REAL	TETRACHLOROETHENE	4	ug/L	J	5
1487	6/14/90	REAL	TETRACHLOROETHENE	7	ug/L		
1487	1/11/91	REAL	TETRACHLOROETHENE	8	ug/L		5
1487	4/15/91	REAL	TETRACHLOROETHENE	4	ug/L	DJ	5
1487	4/15/91	REAL	TETRACHLOROETHENE	4	ug/L	J	5
1487	9/5/91	REAL	TETRACHLOROETHENE	4	ug/L	J	5
1487	11/20/91	REAL	TETRACHLOROETHENE	6	ug/L	J	5
1487	2/21/92	REAL	TETRACHLOROETHENE	6	ug/L		0 02
1487	2/21/92	REAL	TETRACHLOROETHENE	8	ug/L		0 02
1487	5/20/92	REAL	TETRACHLOROETHENE	4	ug/L	DJ	5
1487	5/20/92	REAL	TETRACHLOROETHENE	4	ug/L	J	5
1487	8/31/92	REAL	TETRACHLOROETHENE	9	ug/L	J	50
1487	8/31/92	REAL	TETRACHLOROETHENE	9	ug/L		5
1487	11/11/92	REAL	TETRACHLOROETHENE	15	ug/L		5
1487	3/11/93	REAL	TETRACHLOROETHENE	7	ug/L		5

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Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	5/11/93	REAL	TETRACHLOROETHENE	6	ug/L		5
1487	8/31/93	REAL	TETRACHLOROETHENE	12	ug/L		5
1487	12/8/93	REAL	TETRACHLOROETHENE	6	ug/L	J	5
1487	5/17/94	REAL	TETRACHLOROETHENE	10	ug/L	DJ	5
1487	5/17/94	REAL	TETRACHLOROETHENE	10	ug/L		5
1487	8/10/94	REAL	TETRACHLOROETHENE	10	ug/L	J	5
1487	8/10/94	REAL	TETRACHLOROETHENE	11	ug/L	J	5
1487	8/10/94	REAL	TETRACHLOROETHENE	10	ug/L	J	5
1487	11/16/94	REAL	TETRACHLOROETHENE	13	ug/L	DJ	5
1487	11/16/94	REAL	TETRACHLOROETHENE	12	ug/L		5
1487	6/16/95	REAL	TETRACHLOROETHENE	12	ug/L		10
1487	7/30/96	REAL	TETRACHLOROETHENE	8	ug/L	J	12
1487	6/14/90	REAL	TOLUENE	2	ug/L	J	
1487	8/31/93	REAL	TOTAL XYLENES	5	ug/L		5
1487	11/28/89	DUP	TRICHLOROETHENE	130	ug/L		5
1487	11/28/89	DUP	TRICHLOROETHENE	130	ug/L		5
1487	11/28/89	REAL	TRICHLOROETHENE	110	ug/L	J	5
1487	11/28/89	REAL	TRICHLOROETHENE	110	ug/L	J	5
1487	6/14/90	REAL	TRICHLOROETHENE	170	ug/L		
1487	6/14/90	REAL	TRICHLOROETHENE	170	ug/L		
1487	9/18/90	REAL	TRICHLOROETHENE	59	ug/L		5
1487	9/18/90	REAL	TRICHLOROETHENE	59	ug/L		5
1487	1/11/91	REAL	TRICHLOROETHENE	200	ug/L	E	5
1487	1/11/91	REAL	TRICHLOROETHENE	200	ug/L	E	5
1487	4/15/91	REAL	TRICHLOROETHENE	110	ug/L		5
1487	4/15/91	REAL	TRICHLOROETHENE	110	ug/L		5
1487	9/5/91	REAL	TRICHLOROETHENE	120	ug/L		5
1487	9/5/91	REAL	TRICHLOROETHENE	120	ug/L		5
1487	11/20/91	REAL	TRICHLOROETHENE	170	ug/L		5
1487	11/20/91	REAL	TRICHLOROETHENE	170	ug/L		5
1487	2/21/92	REAL	TRICHLOROETHENE	60 1	ug/L	E	0 03

Analytical data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

65

Groundwater Results for Well 1487

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	2/21/92	REAL	TRICHLOROETHENE	60 1	ug/L	E	0 03
1487	2/21/92	REAL	TRICHLOROETHENE	130	ug/L		0 03
1487	2/21/92	REAL	TRICHLOROETHENE	130	ug/L		0 03
1487	5/20/92	REAL	TRICHLOROETHENE	120	ug/L	D	5
1487	5/20/92	REAL	TRICHLOROETHENE	120	ug/L	D	5
1487	5/20/92	REAL	TRICHLOROETHENE	120	ug/L		5
1487	5/20/92	REAL	TRICHLOROETHENE	120	ug/L		5
1487	8/31/92	REAL	TRICHLOROETHENE	200	ug/L		5
1487	8/31/92	REAL	TRICHLOROETHENE	200	ug/L		5
1487	8/31/92	REAL	TRICHLOROETHENE	180	ug/L		50
1487	8/31/92	REAL	TRICHLOROETHENE	180	ug/L		50
1487	11/11/92	REAL	TRICHLOROETHENE	5	ug/L		5
1487	11/11/92	REAL	TRICHLOROETHENE	5	ug/L		5
1487	3/11/93	REAL	TRICHLOROETHENE	140	ug/L	D	5
1487	3/11/93	REAL	TRICHLOROETHENE	140	ug/L	D	5
1487	3/11/93	REAL	TRICHLOROETHENE	190	ug/L		5
1487	3/11/93	REAL	TRICHLOROETHENE	190	ug/L		5
1487	5/11/93	REAL	TRICHLOROETHENE	130	ug/L	D	10
1487	5/11/93	REAL	TRICHLOROETHENE	130	ug/L	D	10
1487	5/11/93	REAL	TRICHLOROETHENE	130	ug/L		5
1487	5/11/93	REAL	TRICHLOROETHENE	130	ug/L		5
1487	8/31/93	REAL	TRICHLOROETHENE	220	ug/L	E	5
1487	8/31/93	REAL	TRICHLOROETHENE	220	ug/L	E	5
1487	8/31/93	REAL	TRICHLOROETHENE	210	ug/L		50
1487	8/31/93	REAL	TRICHLOROETHENE	210	ug/L		50
1487	12/8/93	REAL	TRICHLOROETHENE	130	ug/L		5
1487	12/8/93	REAL	TRICHLOROETHENE	130	ug/L		5
1487	5/17/94	REAL	TRICHLOROETHENE	190	ug/L	D	5
1487	5/17/94	REAL	TRICHLOROETHENE	190	ug/L	D	5
1487	5/17/94	REAL	TRICHLOROETHENE	190	ug/L		5
1487	5/17/94	REAL	TRICHLOROETHENE	190	ug/L		5

Analytical data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

65

Groundwater Results for Well 1487

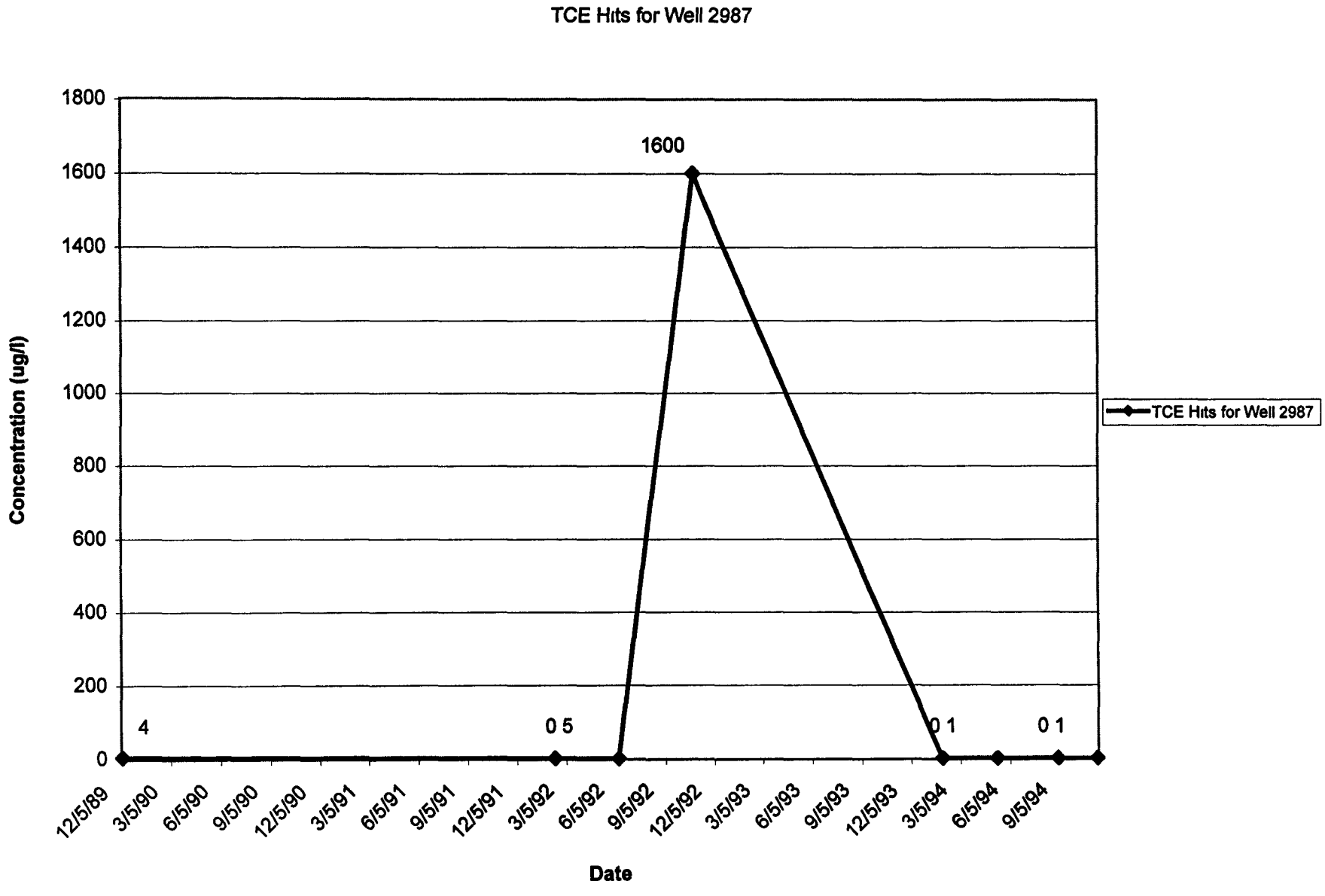
LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
1487	8/10/94	REAL	TRICHLOROETHENE	210	ug/L		5
1487	8/10/94	REAL	TRICHLOROETHENE	210	ug/L		5
1487	11/16/94	REAL	TRICHLOROETHENE	250	ug/L	D	5
1487	11/16/94	REAL	TRICHLOROETHENE	250	ug/L	D	5
1487	11/16/94	REAL	TRICHLOROETHENE	220	ug/L	E	5
1487	11/16/94	REAL	TRICHLOROETHENE	220	ug/L	E	5
1487	6/16/95	REAL	TRICHLOROETHENE	300	ug/L	D	10
1487	6/16/95	REAL	TRICHLOROETHENE	300	ug/L	D	10
1487	6/16/95	REAL	TRICHLOROETHENE	260	ug/L	E	10
1487	6/16/95	REAL	TRICHLOROETHENE	260	ug/L	E	10
1487	7/30/96	REAL	TRICHLOROETHENE	190	ug/L		12
1487	7/30/96	REAL	TRICHLOROETHENE	190	ug/L		12

Analytical data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

Groundwater Results

For

Well 2987


TCE Hits for Well 2987
1800
1600
1400
1200
1000
800
600
400
200
0
Concentration (ug/l)
1600
4
0 5
0 1
0 1
TCE Hits for Well 2987
12/5/89
3/5/90
6/5/90
9/5/90
12/5/90
3/5/91
6/5/91
9/5/91
12/5/91
3/5/92
6/5/92
9/5/92
12/5/92
3/5/93
6/5/93
9/5/93
12/5/93
3/5/94
6/5/94
9/5/94
Date

Groundwater Results for Well 2987

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFER CODE	DETECTION LIMIT
2987	3/8/91	REAL	ACETONE	2	ug/L	BJ	
2987	10/27/92	REAL	ACETONE	100	ug/L		100
2987	10/27/92	REAL	BROMODICHLOROMETHANE	11	ug/L	J	50
2987	10/27/92	REAL	CARBON TETRACHLORIDE	31	ug/L	J	50
2987	10/27/92	REAL	CHLOROFORM	19	ug/L	J	50
2987	8/31/94	REAL	CHLOROFORM	0 1	ug/L	J	0 2
2987	6/9/92	REAL	CYANIDE	2 5	ug/L	B	10
2987	3/22/93	REAL	CYANIDE	220	ug/L		0 01
2987	10/11/90	REAL	METHYLENE CHLORIDE	2	ug/L	BJ	5
2987	3/8/91	REAL	METHYLENE CHLORIDE	2	ug/L	BJ	
2987	5/10/91	REAL	METHYLENE CHLORIDE	5	ug/L		5
2987	9/11/96	REAL	METHYLENE CHLORIDE	2	ug/L		1
2987	3/8/91	REAL	TOLUENE	3	ug/L	BJ	
2987	3/8/91	REAL	TOTAL XYLENES	2	ug/L	BJ	
2987	12/5/89	REAL	TRICHLOROETHENE	4	ug/L		5
2987	12/5/89	REAL	TRICHLOROETHENE	4	ug/L		5
2987	2/12/92	REAL	TRICHLOROETHENE	0 5	ug/L		0 03
2987	2/12/92	REAL	TRICHLOROETHENE	0 5	ug/L		0 03
2987	6/9/92	REAL	TRICHLOROETHENE	0 2	ug/L		0 03
2987	6/9/92	REAL	TRICHLOROETHENE	0 2	ug/L		0 03
2987	10/27/92	REAL	TRICHLOROETHENE	1600	ug/L		50
2987	10/27/92	REAL	TRICHLOROETHENE	1600	ug/L		50
2987	1/31/94	REAL	TRICHLOROETHENE	0 1	ug/L		0 1
2987	1/31/94	REAL	TRICHLOROETHENE	0 1	ug/L		0 1
2987	5/11/94	REAL	TRICHLOROETHENE	0 2	ug/L	J	0 2
2987	5/11/94	REAL	TRICHLOROETHENE	0 2	ug/L	J	0 2
2987	8/31/94	REAL	TRICHLOROETHENE	0 1	ug/L	J	0 2
2987	8/31/94	REAL	TRICHLOROETHENE	0 1	ug/L	J	0 2
2987	11/11/94	REAL	TRICHLOROETHENE	0 1	ug/L	J	0 2
2987	11/11/94	REAL	TRICHLOROETHENE	0 1	ug/L	J	0 2

Analytical data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

Groundwater Result

For

Well 3087

Groundwater Results in Well 3087

LOCATION CODE	COLLECTION DATE	SAMPLE QC CODE	DESCRIPTION	RESULT	UNITS	LAB RESULT QUALIFIER CODE	DETECTION LIMIT
3087	3/8/91	REAL	ACETONE	19	ug/L	B	10
3087	6/9/92	REAL	CYANIDE	2 5	ug/L	B	10
3087	12/12/89	REAL	METHYLENE CHLORIDE	2	ug/L	J	5
3087	5/30/90	REAL	METHYLENE CHLORIDE	13	ug/L		5
3087	10/11/90	REAL	METHYLENE CHLORIDE	2	ug/L	BJ	5
3087	5/10/91	REAL	METHYLENE CHLORIDE	6	ug/L		5
3087	11/11/94	REAL	METHYLENE CHLORIDE	0 1	ug/L	J	0 2
3087	5/21/98	REAL	METHYLENE CHLORIDE	2	UG/L	B	1
3087	5/21/98	REAL	METHYLENE CHLORIDE	0 8	UG/L	J	1

Analytical data is through 1998, Table only reflects "hits" that were observed, non-detected contaminants are not listed

Appendix B

Hydrogeologic Cross Sections

For 903 Pad/Ryan's Pit Plume Area

Appendix C

Estimate of Contaminant Flux for

903 Pad/Ryan's Pit Plum

By ZHT Date 7/15/98 Subject Estimation of Contaminant Flux
Chkd By Date 903 Pad/Ryan's Pit Plume, RFETS

PURPOSE:

Estimate the flux of contaminants from the distal, downgradient portion of the 903 Pad/Ryan's Pit Plume potentially entering surface water in the Woman Creek drainage.

METHODOLOGY:

The alignment of push-probe wells installed in 1998 north of Woman Creek and the South Interceptor Ditch forms the basis of the estimate. All groundwater on the steep south-facing slope above the elevation of the creek bed is assumed to discharge to the surface via seeps.

Transmissivity and concentrations in those wells within the distal portion of the plume are used to calculate the average contaminant loads in colluvium and weathered bedrock. Together with hydraulic conductivity and the length of the plume perpendicular to its flow direction, the flux of the contaminant VOCs are calculated

ASSUMPTIONS:

In the lower portion of the Woman Creek drainage, groundwater flows horizontally out of colluvium and weathered bedrock, discharging to the surface water system. Discharge from bedrock is assumed to be limited to the first 10 feet of saturated bedrock, or the full saturated thickness between top of saturated bedrock and the creekbed elevation along a given point's downgradient flowpath, whichever is greater.

VOC plume concentrations are uniform vertically through the colluvium and weathered bedrock.

The horizontal hydraulic gradient is uniform through the plume along the alignment, and is uniform vertically through colluvium and weathered bedrock.

The following geometric means of hydrogeologic units within RFETS are assumed to be representative:

Colluvium	9.3E-05 cm/sec	2.6E-01 ft/day
Weathered claystone bedrock	8.8E-07 cm/sec	2.5E-03 ft/day

Loss or destruction of contaminants through evapotranspiration, biodegradation, and other processes is not considered All contaminants at the alignment of the push-probe wells are conservatively assumed to enter the surface water drainage.

CALCULATIONS:

See following sheets.

CONCLUSIONS:

Flow and contaminant flux in the weathered bedrock is negligible. The colluvium is inconsistently saturated, and the distal portion of the plume transmits little flow and contaminants to the Woman Creek drainage

Well	Elevation above MSL (feet) 6/18/98 Groundwater	Top of Bedrock	Creekbed on Flowpath	Saturated Thickness Colluvium (ft)	Bedrock Type [1]	Saturated Thickness Bedrock (ft) [2]	Transmissivity Colluvium sq.ft /day	Transmissivity Bedrock sq.ft./day	
01298	5840 43	5837 5	5834	2.90	CS	10.0	7.6E-01	2.5E-02	
01398	5841 85	5844 1	5832	0.00	CS	10 0	0.0E+00	2 5E-02	In
01498	5840 16	5839 9	5828	0.20	CS	11.9	5.3E-02	3.0E-02	Plume
01698	5839.79	5836 6	5822	3.20	CS	14.6	8.4E-01	3.6E-02	
01798	5840 18	5841 9	5821	0.00	CS	19 2	0 0E+00	4 8E-02	
					In-Plume Average T		3 3E-01	3 3E-02	

dh/dl = 0 053 Horizontal hydraulic gradient, from 6/18/98 groundwater elevations in wells 1487, 01398, 01498

L = 400 ft Estimated plume length, perpendicular to flow

Q = KA(dh/dl)
Q = TL(dh/dl) Using average in-plume Transmissivity (T) values above.

Flow in cu ft /day

	Colluvium	Bedrock	Total
Q =	7.0	0 69	7.7

Average groundwater velocities (v) within plume
v= K(dh/dl)/n where effective porosity n is assumed to be 0.1.

Velocity in ft /day

	Colluvium	Bedrock
v =	0.14	0.0013

Time (years) to travel 350 feet (distance on flowpath from 01298 to creek =

Colluvium	Bedrock
6 9	725 2

Footnotes

1 Bedrock type CS = Weathered claystone (encountered in all alignment borings)
2 Saturated bedrock thickness considered is 7 feet (consistent with practicable depth of barrier emplacement)

Volatile Organic Compounds in Groundwater
903 Pad/Ryan's Pit Plume

774116 04

Excel 97 file FluxRP5a.xls, Concentration

Well	RIN	Event	Bottle	Concentration in ug/L Methylene Chloride	1,1-Dichloroethene	Chloroform	Carbon Tetrachloride	Trichloroethene	Tetrachloroethene	cis-1-2-Dichloroethene	Napthalene	
01298	98A1951	002	001	24	3	96	460	500	23	9	U	
01398	98A2143	004	002	10	U	7	U	9	U	U	6	In
01498	98A1951	003	001	31	U	U	U	U	U	U	U	Plume
01698	98A2143	002	002	U	U	73	150	42	U	U	3	
01798	98A2143	003	002	U	U	32	13	12	U	U	4	
01998	98A2143	001	002	U	U	U	U	U	U	U	U	

Well	RIN	Event	Bottle	Tier I (100 times MCL) and Tier II (1 times MCL) Action Level Exceedances (MCLs are shown immediately below) 5 Methylene Chloride	7 1,1-Dichloroethene	100 Chloroform	5 Carbon Tetrachloride	5 Trichloroethene	5 Tetrachloroethene	70 cis-1-2-Dichloroethene	#N/A Napthalene	
01298	98A1951	002	001	>1x	<	<	>1x	>1x	>1x	<		
01398	98A2143	004	002	>1x	--	<	--	>1x	--	--		In
01498	98A1951	003	001	>1x	--	--	--	--	--	--		Plume
01698	98A2143	002	002	--	--	<	>1x	>1x	--	--		
01798	98A2143	003	002	--	--	<	>1x	>1x	--	--		
01998	98A2143	001	002	--	--	--	--	--	--	--		

Note The plume extent as defined above incorporates all exceedances of Tier II action levels along the alignment

81

Well	RIN	Event	Bottle	Methylene Chloride	1,1-Dichloroethene	Chloroform	Carbon Tetrachloride	Trichloroethene	Tetrachloroethene	cis-1-2-Dichloroethene	Napthalene	Total VOCs
				Colluvium Contaminant Load in g/day/ft								
01298	98A1951	002	001	5 2E-04	6 5E-05	2.1E-03	1.0E-02	1 1E-02	5 0E-04	1 9E-04	0 0E+00	2 4E-02
01398	98A2143	004	002	0 0E+00	0 0E+00	0.0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00
01498	98A1951	003	001	4 6E-05	0 0E+00	0.0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	4.6E-05
01698	98A2143	002	002	0 0E+00	0 0E+00	1.7E-03	3 6E-03	1 0E-03	0 0E+00	0 0E+00	7 2E-05	6 4E-03
01798	98A2143	003	002	0 0E+00	0 0E+00	0.0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00
Average				1 1E-04	1 3E-05	7.8E-04	2 7E-03	2 4E-03	1 0E-04	3 9E-05	1 4E-05	6 1E-03

Well	RIN	Event	Bottle	Methylene Chloride	1,1-Dichloroethene	Chloroform	Carbon Tetrachloride	Trichloroethene	Tetrachloroethene	cis-1-2-Dichloroethene	Napthalene	Total VOCs
				Bedrock Contaminant Load in g/day/ft								
01298	98A1951	002	001	1 7E-05	2 1E-06	6 6E-05	3 3E-04	3 5E-04	1 6E-05	6 4E-06	0 0E+00	7 9E-04
01398	98A2143	004	002	7 1E-06	0 0E+00	4.9E-06	0 0E+00	6 4E-06	0 0E+00	0 0E+00	4 2E-06	2 3E-05
01498	98A1951	003	001	2 6E-05	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	2 6E-05
01698	98A2143	002	002	0 0E+00	0 0E+00	7.5E-05	1 5E-04	4 3E-05	0 0E+00	0 0E+00	3 1E-06	2 8E-04
01798	98A2143	003	002	0 0E+00	0 0E+00	4.3E-05	1 8E-05	1 6E-05	0 0E+00	0 0E+00	5 4E-06	8 3E-05
Average				1 0E-05	4 2E-07	3.8E-05	9 9E-05	8 4E-05	3 3E-06	1 3E-06	2 6E-06	2.4E-04

Well	RIN	Event	Bottle	Methylene Chloride	1,1-Dichloroethene	Chloroform	Carbon Tetrachloride	Trichloroethene	Tetrachloroethene	cis-1-2-Dichloroethene	Napthalene	Total VOCs
				Total Contaminant Load in g/day/ft								
01298	98A1951	002	001	5 4E-04	6 7E-05	2.1E-03	1 0E-02	1 1E-02	5 1E-04	2 0E-04	0 0E+00	2 5E-02
01398	98A2143	004	002	7 1E-06	0 0E+00	4.9E-06	0 0E+00	6 4E-06	0 0E+00	0 0E+00	4 2E-06	2 3E-05
01498	98A1951	003	001	7 2E-05	0 0E+00	0.0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	0 0E+00	7 2E-05
01698	98A2143	002	002	0 0E+00	0 0E+00	1.8E-03	3 7E-03	1 0E-03	0 0E+00	0 0E+00	7 5E-05	6 7E-03
01798	98A2143	003	002	0 0E+00	0 0E+00	7.3E-05	1 8E-05	1 6E-05	0 0E+00	0 0E+00	5 4E-06	8 3E-05
Average				1 2E-04	1 3E-05	8.0E-04	2 8E-03	2 4E-03	1 0E-04	4 0E-05	1 7E-05	6 4E-03

X = TC g/day/ft Contaminant load equals transmissivity times concentration

Unit conversion T(sq ft/day) x C (ug/L) x 28.321 l/cu ft x 10-6 g/ug =TC (g/(day/ft)

T is taken from the values calculated for both colluvium and bedrock at individual wells on the "Flow" sheet

C is from the table of concentrations on the "Concentration" sheet

Contaminant Flux
903 Pad/Ryan's Pit Plume

774115 04

	Contaminant Flux in g/day								
	Methylene Chloride	1,1-Dichloroethene	Chloroform	Carbon Tetrachloride	Trichloroethene	Tetrachloroethene	cis-1-2-Dichloroethene	Napthalene	Total VOCs
Colluvium	2 4E-03	2.8E-04	1.6E-02	5.7E-02	5 0E-02	2.1E-03	8 3E-04	3.0E-04	1.3E-01
Bedrock	2 1E-04	9 0E-06	8 1E-04	2.1E-03	1 8E-03	6.9E-05	2.7E-05	5.4E-05	5 1E-03
Total	2 6E-03	2 8E-04	1 7E-02	6.0E-02	5 2E-02	2 2E-03	8 5E-04	3 6E-04	1 3E-01

F = Q C — Contaminant Flux equals flow times concentration

F = [TL(dh/dl)]C

F = XL(dh/dl) — Contaminant Flux equals Contaminant Load times Length times hydraulic gradient

dh/dl = 0 053 — Horizontal hydraulic gradient, from 6/18/98 groundwater elevations in wells 1487, 01398, 01498

L = 400 ft — Estimated plume length, perpendicular to flow.

X Is taken from the average values calculated for colluvium and bedrock on the "Load" sheet

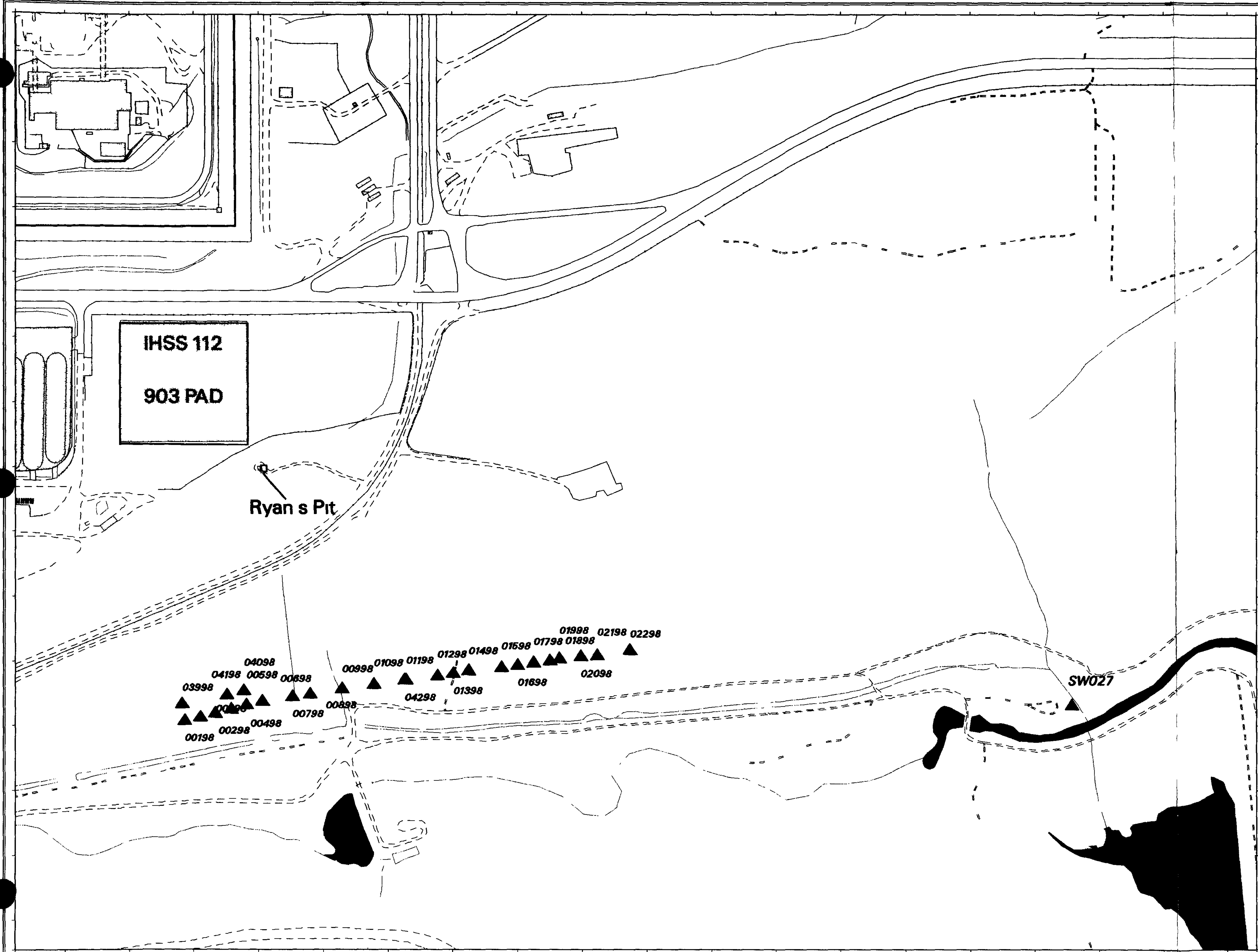


Figure 1 1
903 Pad/Ryan's Pit
Plume Location Map

EXPLANATION

▲ SW027

▲ Temporary well installed in 1998

Standard Map Features

Buildi gs and other structure

Lakes and ponds

Streams, ditches, or other drai age feature

Fences and other barriers

Paved roads

Dirt roads

Scale 3570
Inch represents approximately 298 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD

U S Department f Energy
Rocky Flats Environmental T chnology Site

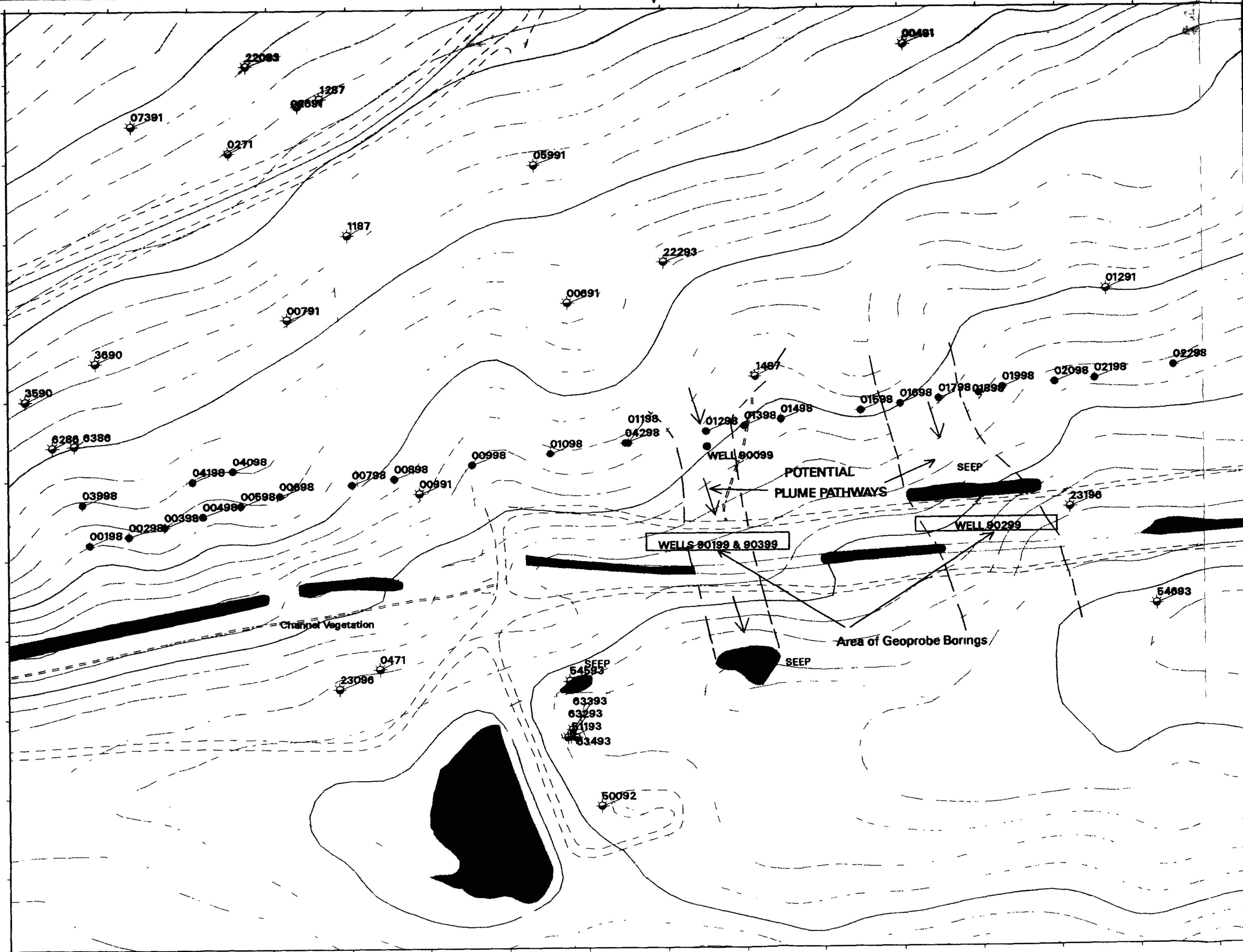
Prepared by

RMRS Rocky Mountain Remediation Services, L.L.C
Geographic Information Systems Group

MAP ID: 99-0298

April 8, 999

NT S w/p j t /fy99/99 0238/ ry pit lo ml



Location of Seeps, Groundwater Flow Paths and Proposed Well Locations

Figure 1-2

EXPLANATION

- 1998 Well Locations (IT 1998a)
- Existing Well Locations
- Proposed Well locatio
- Geoprobe/Well Ivestigation Are
- Seep
- Channel Vegeta io

Standard Map Feature

- Lake a d pond
- Stream ditches, othe drainage fe ture
- Fence d othe barriers
- Contou (5-Foot)
- D rt road

Scale = 1 1530
1 inch represent approximately 128 feet

0 0 100 200ft

Stat Plan Coordinat Project on
Colorado Cent al Zone
Datum NAD27

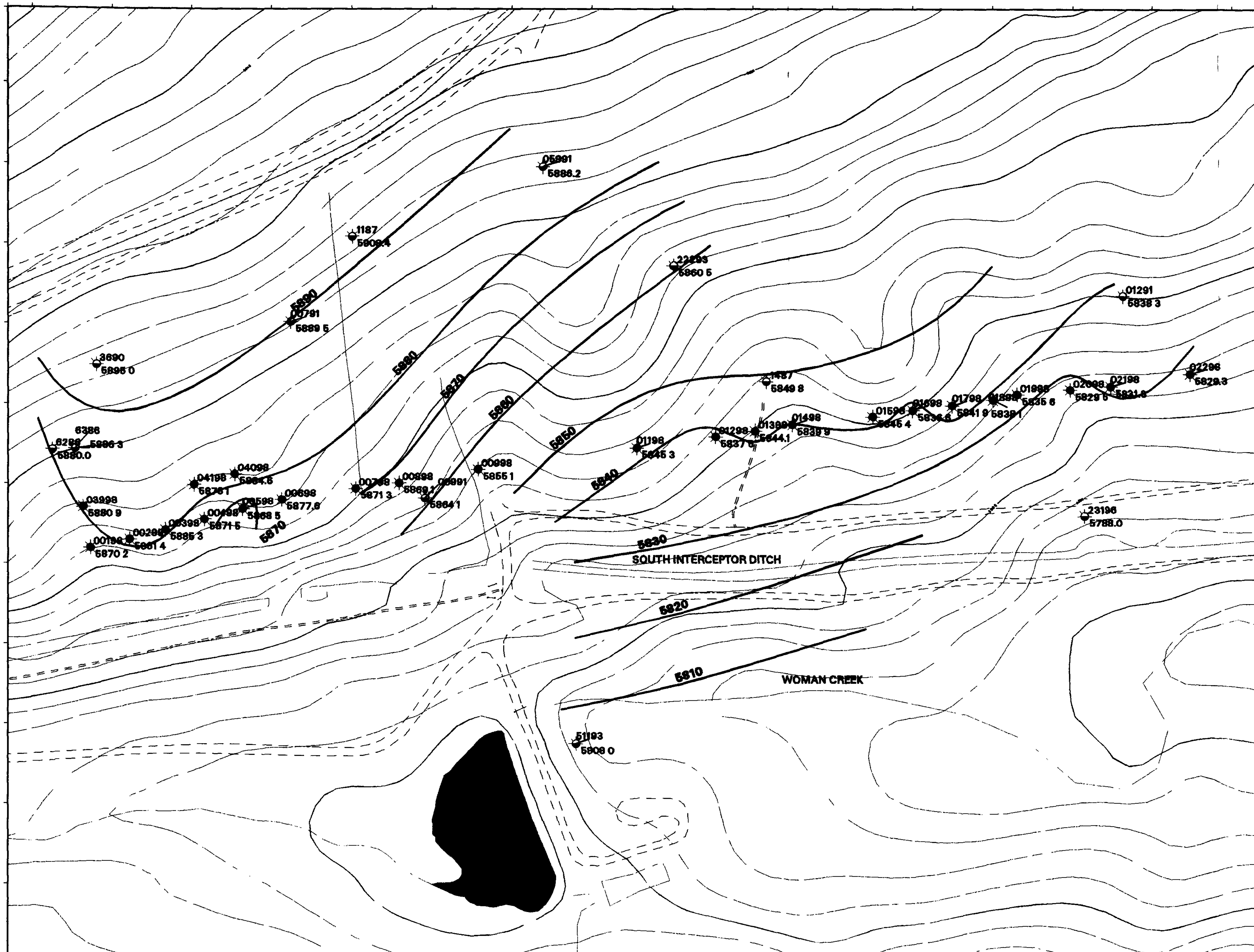
U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared by
RMRS Rocky Mountain Remediatio Services, L.L.C.
Geographic Information Systems Group

MAP ID: 99-0263 May 05 1999

NT S /p i /fy /99 0 3/fg 2 ml

9



Top of Bedrock Map, in the 903 PAD/Ryan s Pit Plume Study Area

Figure 1-3

EXPLANATION

- 1998 Well Locations (IT 1998a)
- Existing Well Locations
- Top of Bedrock Elevatio Contours (Feet above mea sea level)

Standard Map Features

- Building nd othe structure
- Sola evaporatio pond
- Lakes d pond
- Streams, ditches, or othe drainage feature
- Fence nd othe barriers
- Contour (5-Foot)
- Paved road
- Dirt roads

DATA SOURCE:

Scale – 1 1530
1 inch represent approximately 128 feet

50 0 100 200ft

Stat Plane Coordi at Projection
Colorado Cent al Zone
Datum NAD27

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MAP ID: 99-0263

May 13, 1999

NT S w/p | tafy99/99 0263/fig 1-3 brian ml

Figure 2-1

Trichloroethene Concentration in Groundwater 1991 1997 (Avg.)

EXPLANATION

Trichloroethene concentration equal t or greater than 5 g/L

Trichloroethene concentration equal t or greater than 500 g/L

Trichloroethene Concentration (ug/L)

- U detected
- 0 0 5
- 0 5 1
- 1 5
- 5 100
- 100 500
- > 500

- All ial Well
- Bedrock Well
- All ial/Bedrock Well
- Tempo ary well i stalled i 1998

Standard Map Features

- B ldi g and other st uct
- Solar evaporation ponds
- Lakes and po d
- Streams, dit hes, oth dral age feat re
- Fe ce and oth bar
- Conto (20-Foot)
- Paved road
- Dirt road

DATA SOURCE:
Ther Action Level ug/L
Ther Action Level 500 ug/L
Note: 19 values above Ther Action Level

Scale 23 Inch represents approximatel 93 feet

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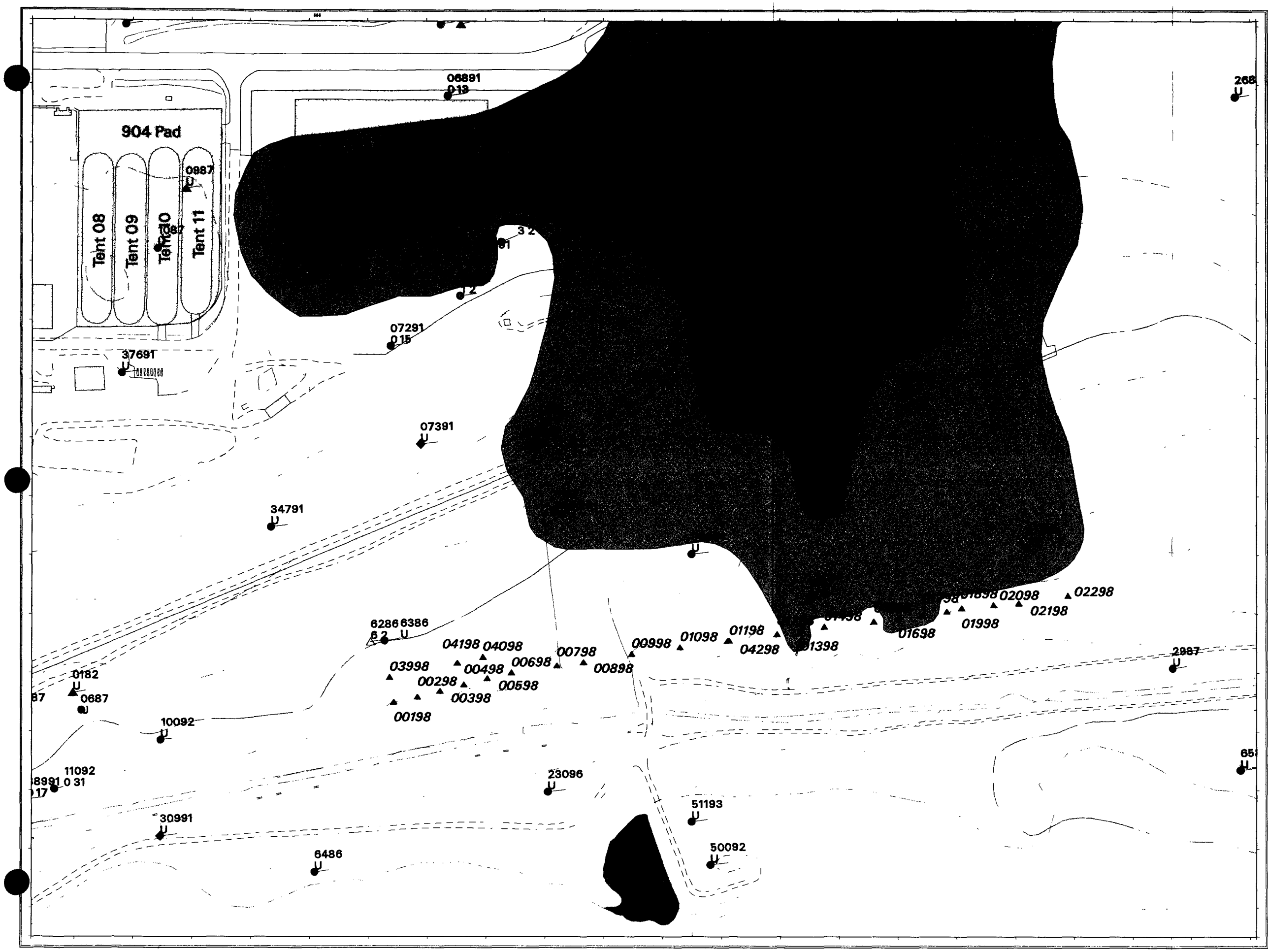
80402-046

MAP ID: 99-0298 May 2, 999

NT S w/p j ta/fy99/99 0298/f pi m mi

Figure 2-2
Carbon Tetrachloride Concentration in Groundwater 1991 1997 (Avg.)



EXPLANATION

- Carbon Tetrachloride concentration equal to or greater than 5 µg/L
- Carbon Tetrachloride concentration equal to or greater than 500 µg/L

Carbon Tetrachloride Concentration (ug/L)

- U detected
- 0 0.5
- 0.5 1
- 1 5
- 5 100
- 100 500
- > 500

- Alluvial Well
- Bedrock Well
- Alluvial/Bedrock Well
- Temporary well installed 1998

Standard Map Features

- Building and other structure
- Solar evaporation pond
- Lake and pond
- Streams, ditches, other drainage features
- Fence and other barrier
- Contour (20-Foot)
- Paved road
- Dirt road

N

Scale 2.2 inch represent approximately 93 feet

0 100 200m

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Colorado Central Zone
Datum NAD

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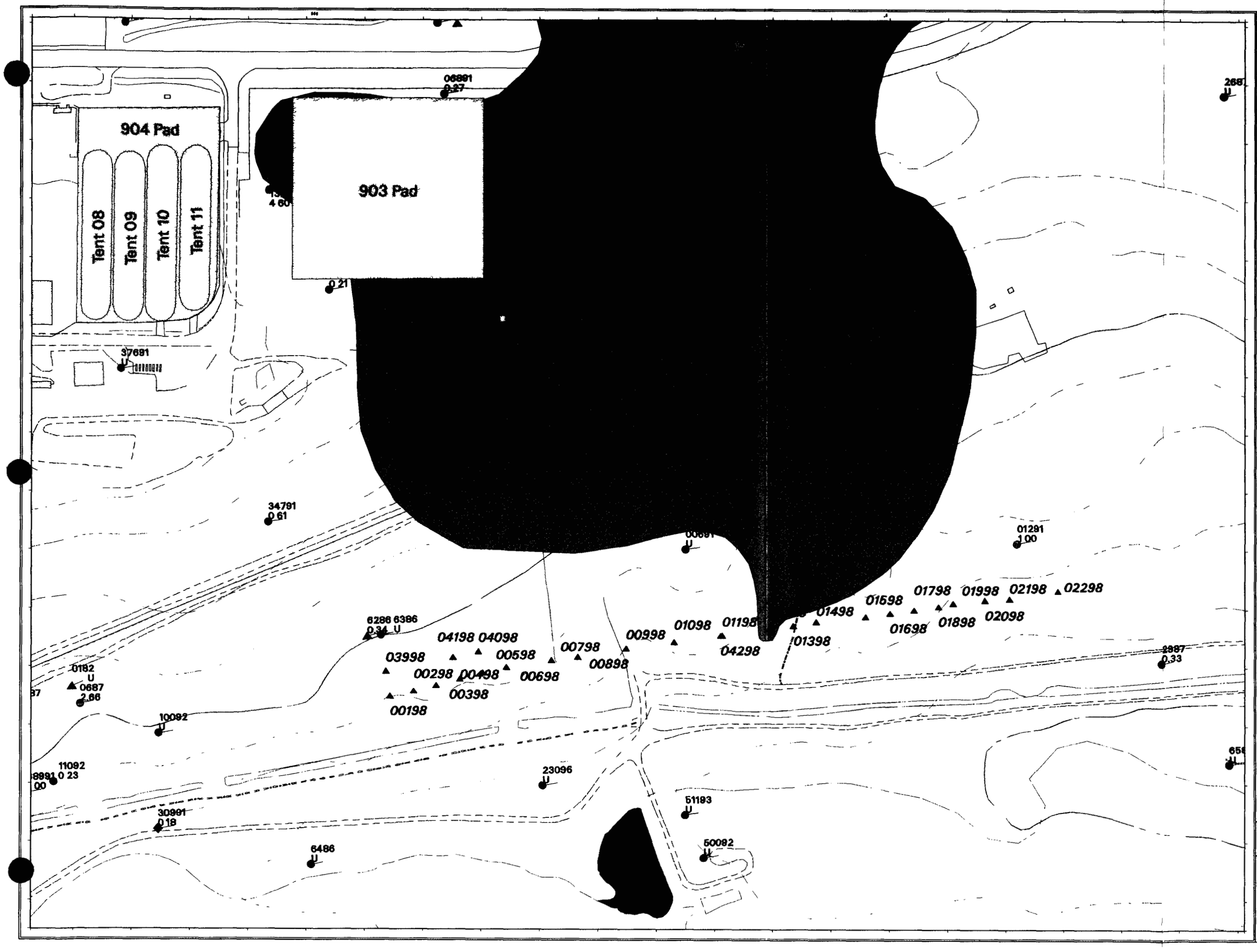
(303) 464-8040 -6464

AP ID 99-0238 May 2, 999

NT 8 w/p] /fy99/99 0238/ l4 pl m mi


904 Pad
903 Pad
Tent 08
Tent 09
Tent 10
Tent 11
06891
0.27
37691
34791
0.61
0.21
4.60
6286 6386
0.34 U
04198 04098
03998
00598
00798
00998
01098
01198
04298
01398
01498
01698
01798
01998
02198
02298
02098
00298 00498
00698
00898
00398
00198
0182
U
0687
2.66
10092
11092
0.23
23096
30991
0.18
6486
51193
50092
01291
1.00
2887
0.33
Figure 2-3
Tetrachloroethene Concentration
in Groundwater 1991 1997 (Avg.)
EXPLANATION
Tetrachloroethene concentration equal to or greater than 5 g/L
Tetrachloroethene concentration equal to or greater than 500 g/L
Tetrachloroethene Concentration (ug/L)
Undetected
0 0.5
0.5 1
1 5
5 100
100 500
> 500
Alluvial Well
Bedrock Well
Alluvial/Bedrock Well
Temporary well installed i 1998
Standard Map Features
Buildi ge and other structure
Solar evaporatio ponds
Lake and ponds
Streams, ditches, or other drai age features
Fences and other barrier
Contou (20-Foot)
Rocky Flat bou dary
Paved roads
Dirt roads
N
Scale 2 2
Inch represents approximately 83 feet
0 0 150 300ft
State Plane Coordinat Projection
Colorado Central Zone
Datum NAD2
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Rocky Mountain Remediation Services, L.L.C
Geographic Information Systems Group
Rocky Flats Environmental colnology Site
Box 464
Golden 80402-0464
MAP ID: 98-0288
April 20, 999
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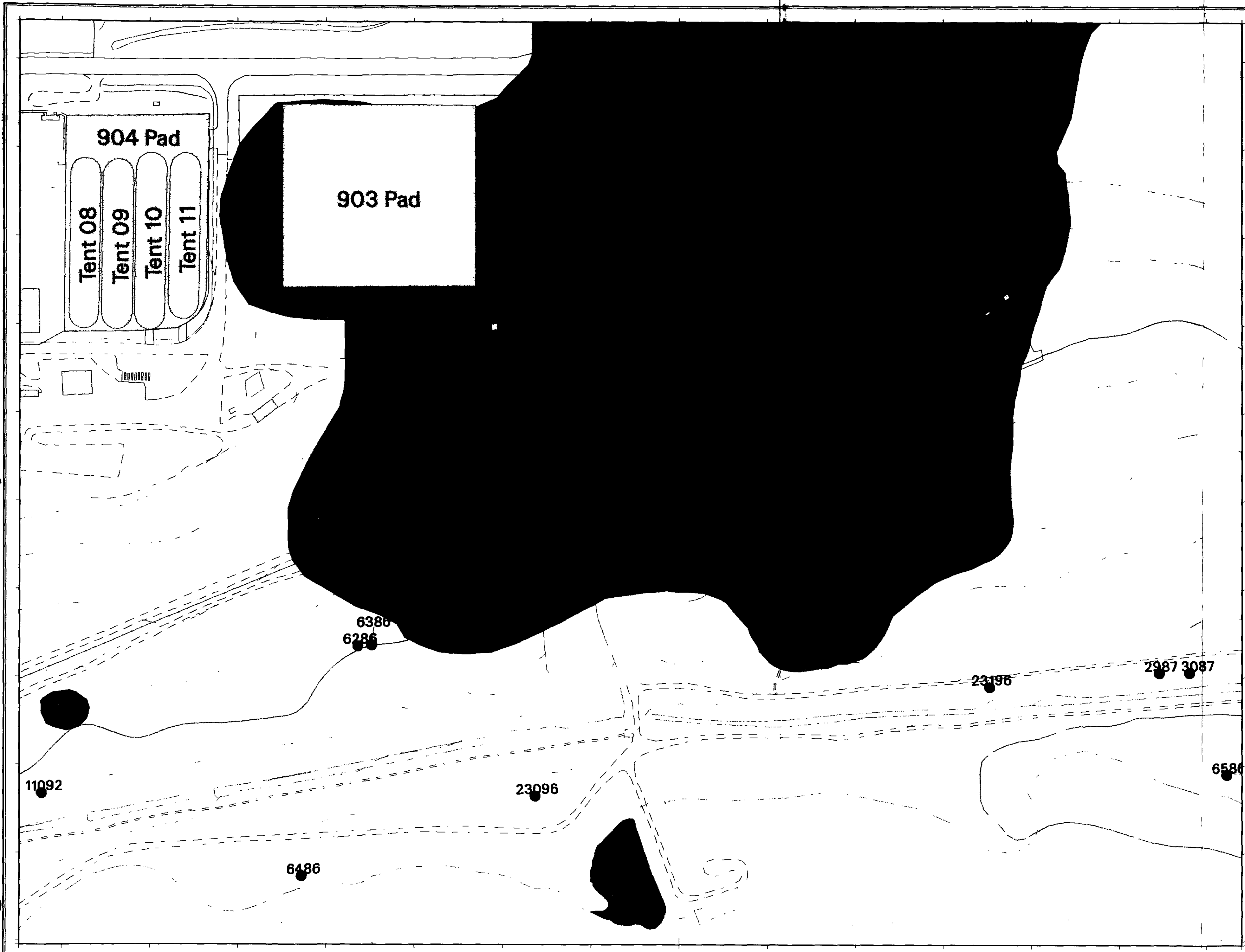

Figure 2-4
VOC Composite Plume Map

EXPLANATION

- Composite VOC Groundwater Plume (100 X MCL)
- Composite VOC Groundwat Plume (concentratio equal to MCL)
- IMP Water Quality Mo itoring Well
- Non IMP Monitoring Well

Standard Map Features

- Building and the st uct re
- Solar evapo atio pond
- Lake and pond
- Streams, ditches, othe d ai age feature
- Fence and othe barriers
- Contou (20-Foot)
- Paved road
- D rt road

DATA SOURCE

Scal = 1 2430
1 h pr sent appr ximately 203 feet

0 200ft

State Plan Coord at Project on
Colo ado Cent al Z
Dat m NAD27

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MAP ID 99-0128

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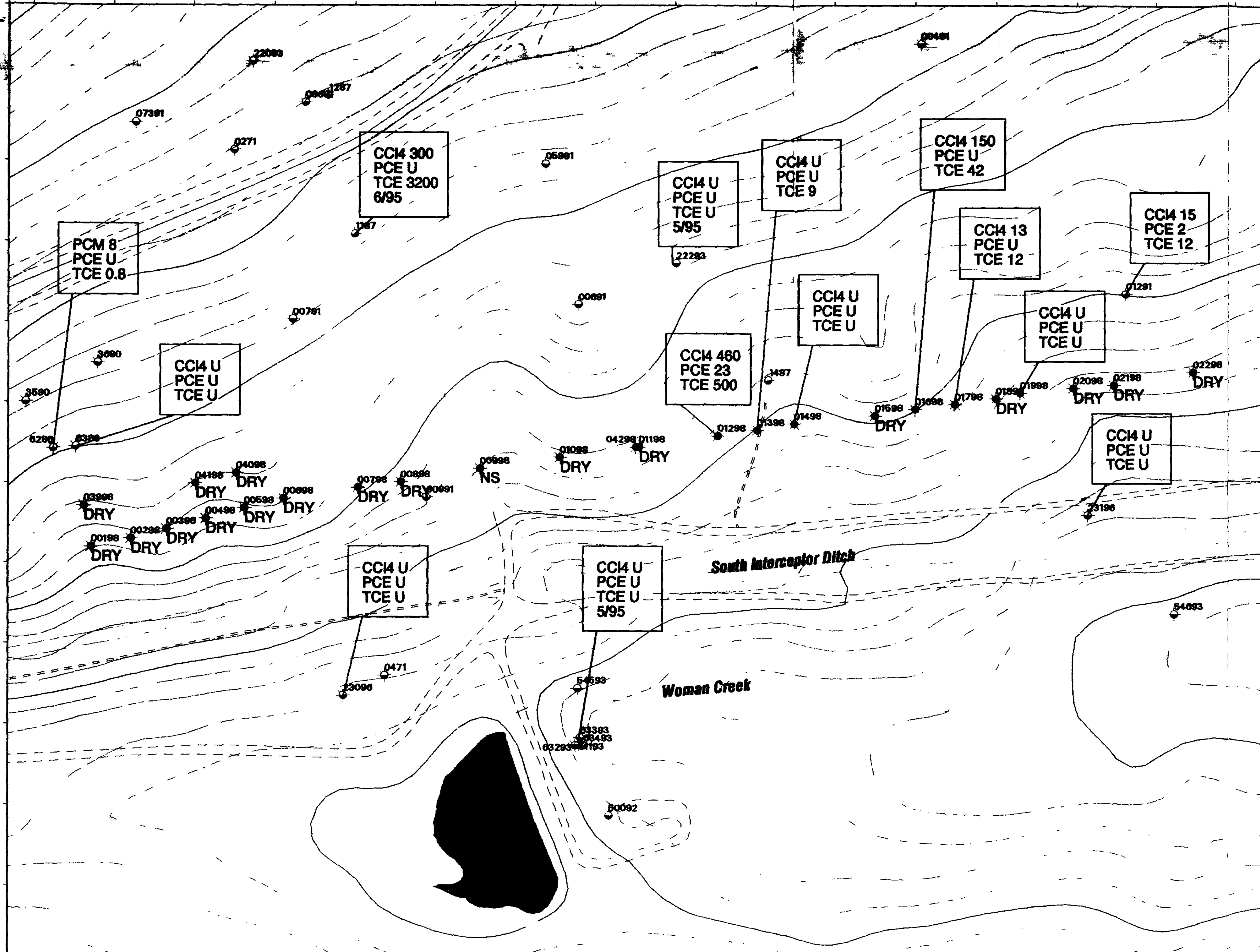

VOCs in Groundwater at the 903 PAD/Ryan's Pit Plume Study Area

Figure 2-5

EXPLANATION

Groundwater Sampling Wells

- 1998 Well Locations (IT 1998a)
- Existing Well Locations

CCl4 460
PCE 23
TCE 500

VOC Concentrations in Groundwater ug/l
-CCl4 = Carbon Tetrachloride
PCE = Tetrachloroethene
TCE = Trichloroethene
-U = Not Detected
-DRY = Not Sampled (No Water)
-NS = Not Sampled (Insufficient Water)

Standard Map Features

- Lakes d pond
- Streams, ditches, or othe drainage feature
- Fence nd othe barriers
- Contour (5-Foot)
- Dirt roads

Scale = 1 1530
1 inch represent approximately 128 feet

50 0 100 200ft

Stat Plane Coordi at Project o
Colorado Cent al Zon
Datum NAD27

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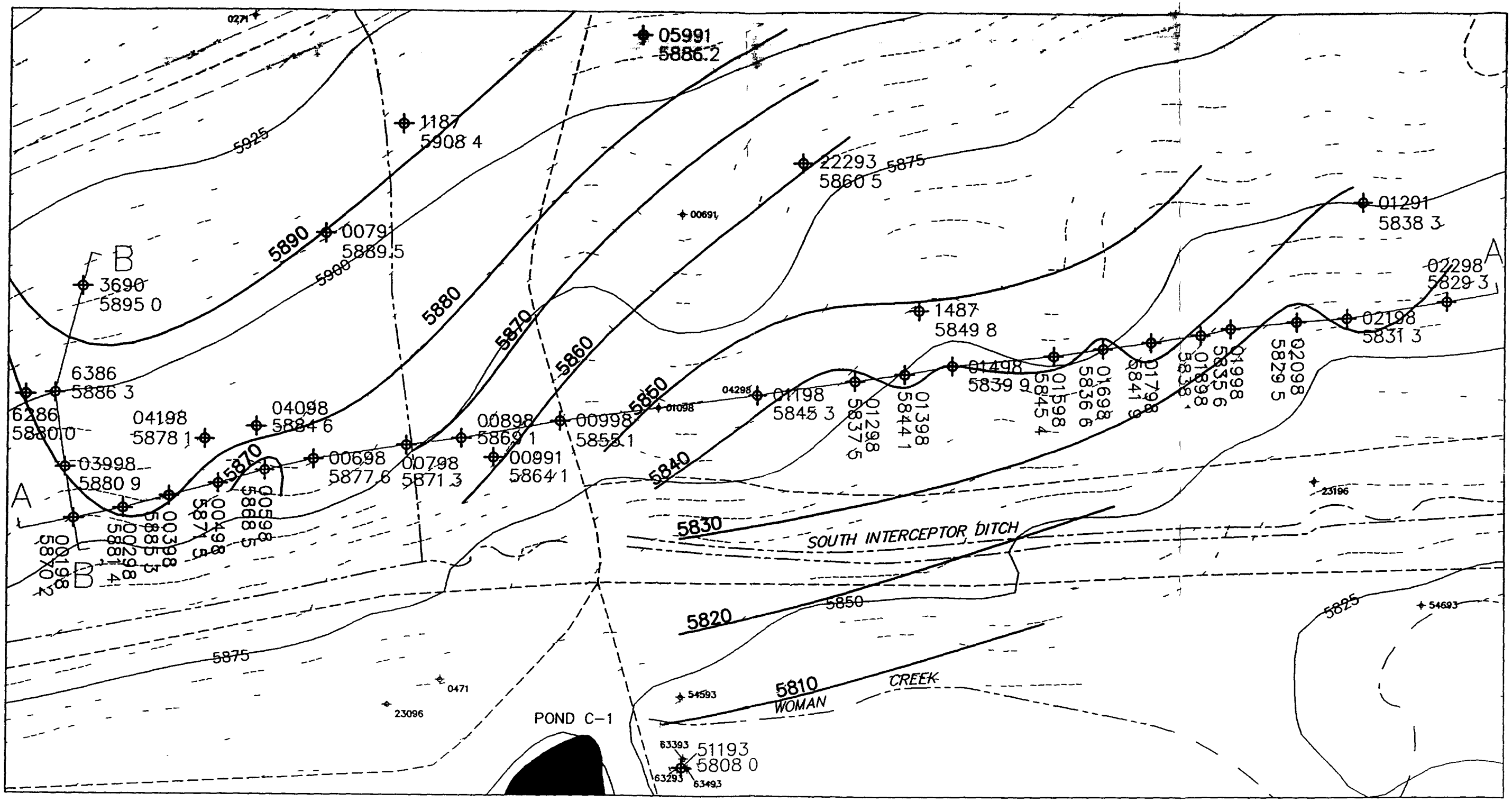
MAP ID: 99-0263

May 05 1999

NT S /p j /fy9 /99 0263/fig 2 5 ml



LEGEND

- LAKES AND PONDS
- STREAMS AND DITCHES
- FENCE OR OTHER BARRIER
- PAVED ROAD
- DIRT ROAD
- 25 FOOT SURFACE CONTOUR
- 5 FOOT SURFACE CONTOUR
- 5940 — TOP OF BEDROCK ELEVATION CONTOUR
- A — A HYDROGEOLOGIC CROSS SECTION ALIGNMENT
- 00898 / 5869 1 — WELL LOCATION SHOWING BEDROCK ELEVATION
- 00991 — EXISTING DATA LOCATION

GRAPHIC SCALE
0 25 50 00
(IN FEET)
1 inch = 100 ft.

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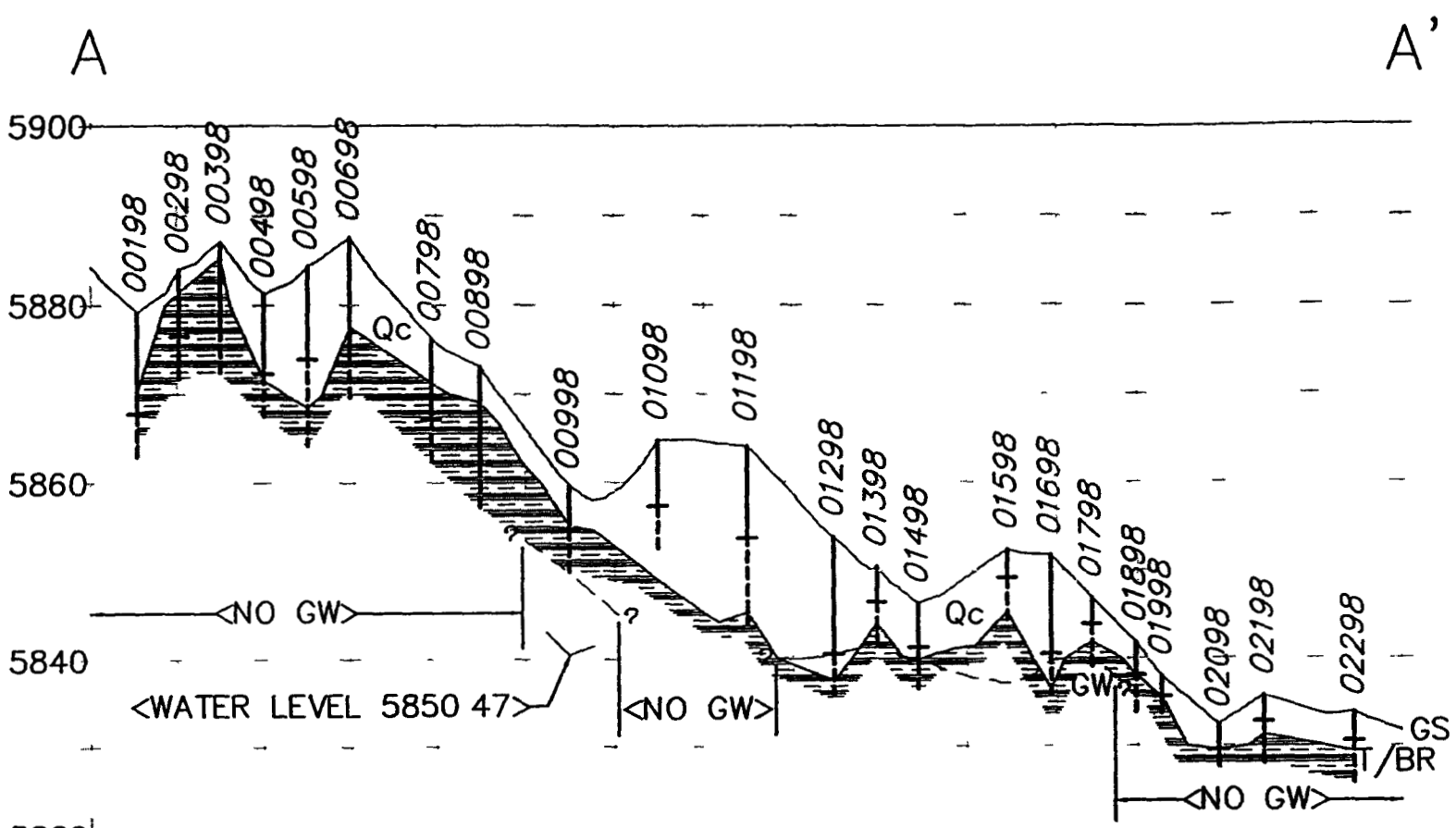
FIGURE B 1

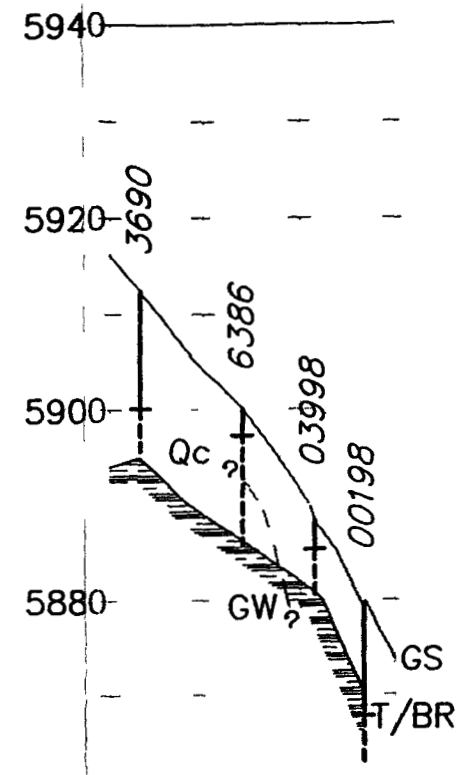
TITL
TOP OF BEDROCK MAP
903 PAD/RYAN S PIT
PLUME STUDY AREA

PROJ. NO	774115	DWG NO	4115B006	SHEET
DESIGN BY	ZT	CHECKED		OF
DRAWN BY	JDL	APPROVED		
DATE	6-23-98			

DEN\CADD\FLATS\774115\ASBUILT\4115B006.DWG 7/16/98 JDL



HYDROGEOLOGIC CROSS SECTION A A



HYDROGEOLOGIC CROSS SECTION B B

LEGEND

GS	GROUND SURFACE
GW	GROUND WATER SURFACE
T/BR	TOP OF BEDROCK
QrF	ROCKY FLATS ALLUVIUM
Qc	COLLUVIUM
	CLAYSTONE

23897 MONITORING WELL OR PIEZOMETER

SCREENED INTERVAL

GRAPHIC SCALE
0 50 00 200
(IN FEET)
1 inch = 200 ft.

VERTICAL SCALE
1 inch = 50 ft.

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Golden, Colorado

FIGURE B 2

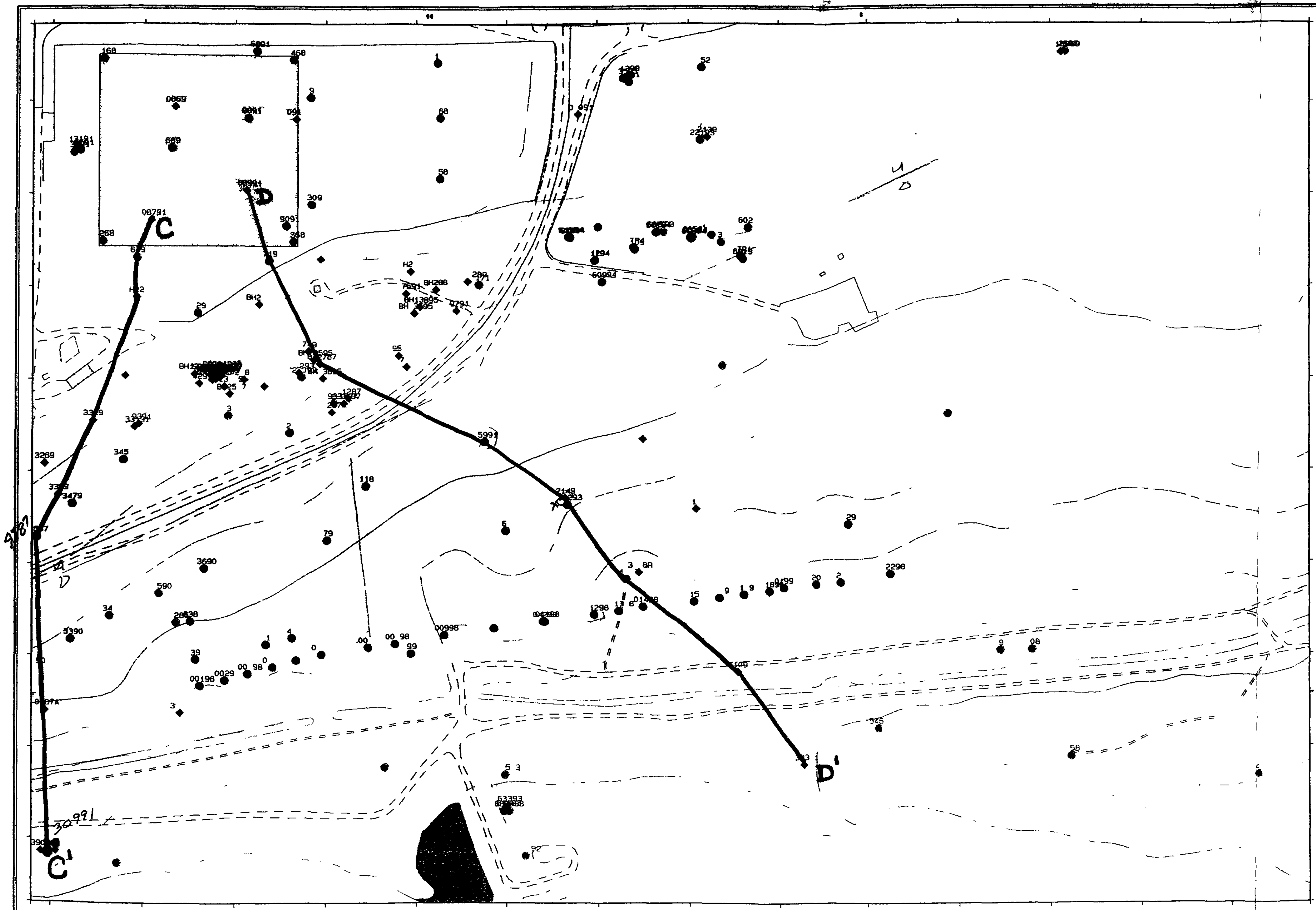
TITLE
HYDROGEOLOGIC CROSS SECTIONS 903 PAD/RYAN S PIT PLUME STUDY AREA

PROJ NO	774115	DWG NO	4115B008	SHEET
DESIGN BY	ZT	CHECKED		OF
DRAWN BY	JDL	APPROVED		
DATE	6-25-98	SCALE	1 100	

DEN\CADD\FLATS\774115\ASBUILT\4115B008.DVG 7/16/98 JDL

FIGURE B-3

HYDROGEOLOGIC CROSS SECTION ALIGNMENT FOR C-C AND D-D



Rocky Flats Environmental Technology Site

EXPLANATION

- 1998 Well Locations
- Groundwater Wells
- Boreholes

Standard Map Feature

- Buildings and othe tructure
- Solar evaporatio ponds
- Lakes and ponds
- Streams, ditches, the drainage features
- Fences and other barriers
- Contou (20-Foo)
- Paved roads
- Dirt roads

Scal = 1 2470
1 nch pr sent appr ximately 206 f et

Stat Plan Coord at Pr ject
Colo ado Ce t al Z ne
Dat m NAD27

U S Department of Energy
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Prepared by:

RMRS Rocky Mountain Remediation Services

MAP ID 99-0161

February 15 1999

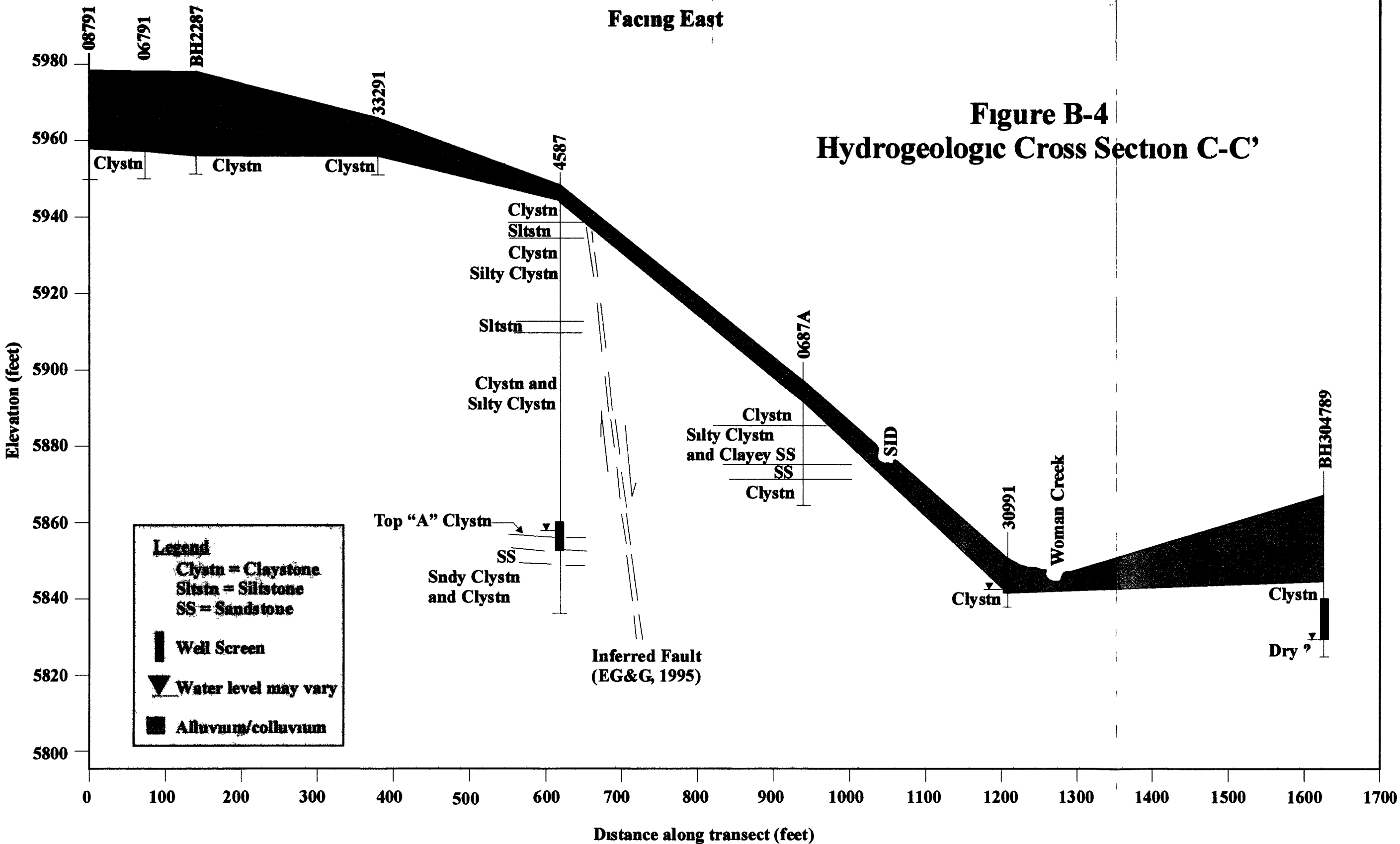
15

C

C'

Facing East

Figure B-4
Hydrogeologic Cross Section C-C'



D

D'

Facing East

Figure B-5
Hydrogeologic Cross Section D-D'